GEOGRAPHY, RESOURCES & INDUSTRIES

June, 1944

JUN 9 1944

EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

March, 1943 and 1944

SOURCE AND DISPOSAL OF ENERGY—MONTH OF MARCH

	1944	1943	%
GENERATION* (Net)			
By Fuel Burning Plants	12,757,657,000	11,202,072,000	+13.9
By Water Power Plants	7,013,986,000	6,618,908,000	+ 6.0
Total Generation	**19,771,643,000**	**17,820,980,000**	**+10.9**
Add—Net Imports Over International Boundaries	112,333,000	128,300,000	−12.4
Less—Company Use	150,991,000	142,448,000	+ 6.0
Less—Energy Used by Producer	554,595,000	739,340,000	−25.0
Net Energy for Distribution	**19,178,390,000**	**17,067,492,000**	**+12.4**
Losses and Unaccounted for	2,411,784,000	2,270,679,000	+ 6.2
Sales to Ultimate Customers	**16,766,606,000**	**14,796,813,000**	**+13.3**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of March 31st			
Residential or Domestic	26,956,466	26,609,016	+ 1.3
Rural (Distinct Rural Rates)	1,102,196	1,059,327	.....
Commercial or Industrial:			
Small Light and Power	4,179,958	4,171,492	+ 0.3
Large Light and Power	149,085	144,578	
Other Customers	119,903	120,450	.....
Total Ultimate Customers	**32,507,608**	**32,104,863**	**+ 1.3**
KILOWATTHOUR SALES—During Month of March			
Residential or Domestic	2,688,214,000	2,386,150,000	+12.7
Rural (Distinct Rural Rates)	172,124,000	171,405,000	+ 0.4
Commercial or Industrial:			
Small Light and Power	2,462,332,000	2,252,616,000	+ 9.3
Large Light and Power	9,652,430,000	8,434,553,000	+14.4
Street and Highway Lighting	185,725,000	176,039,000	+ 5.5
Other Public Authorities	852,529,000	637,965,000	+33.6
Railways and Railroads:			
Street and Interurban Railways	426,132,000	431,251,000	− 1.2
Electrified Steam Railroads	241,774,000	222,472,000	+ 8.7
Interdepartmental	85,346,000	84,362,000	+ 1.2
Total to Ultimate Customers	**16,766,606,000**	**14,796,813,000**	**+13.3**
Revenue from Ultimate Customers	**$275,336,600**	**$249,869,700**	**+10.2**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended March 31st			
Kilowatthours per Customer	1,095	1,026	+ 6.7
Average Annual Bill	$39.09	$37.55	+ 4.1
Revenue per Kilowatthour	3.57¢	3.66¢	− 2.5

(*) By courtesy of the Federal Power Commission.

Vol. 12, No. 6, EDISON ELECTRIC INSTITUTE BULLETIN; published monthly. Entered as second-class matter Aug. 17, 1933, at the post office at Philadelphia, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia, Pa. Editorial office, 420 Lexington Ave., New York, N. Y. Subscription rate $2.00 per year in the United States; $3.00 per year in foreign countries.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

EDISON ELECTRIC INSTITUTE BULLETIN

Volume 12 JUNE, 1944 No. 6

Broadened Horizons for Electric Power

By H. C. Thuerk

President, New Jersey Power & Light Company and Chairman of Postwar Planning Committee Edison Electric Institute

Presented before the Annual Meeting of the National Association of Mutual Savings Banks, New York, May 12

THERE stands today no institution more symbolic of strong, virile American life than the savings bank. Coming into existence almost at the birth of this nation, it stands for that inherent desire of our people to achieve increased security and independence by their own efforts. For years it has assumed leadership in spreading the philosophy of thrift, one of the basic forces in our economy.

The United States has become great through the development of this philosophy. Under its influence, the workers of this nation have accumulated the funds which have built America. These funds have constructed great railroads, industrial enterprises, private and public institutions of learning, and thousands of other useful projects. We in the electric light and power industry can appreciate these accomplishments because a large portion of these savings has been used to build our own industry.

The adage of saving "for a rainy day" has been supplemented with the motto "save for happier days" with the result that through thrift our people now have comforts unthought of but a few years ago. And so it is but another evidence of your stewardship that you should be interested in analyzing now the future effect of accumulated savings and what will be the opportunities for putting those savings to work for the benefit of your depositors and for the public as a whole.

A glance at the past may offer some background in determining the outlook for the electric power industry in the postwar period. Ever since the outbreak of World War I in 1914 the electric utility companies have sensed the heavy responsibility resting on their shoulders to help win any war in which this country was a belligerent. Today they produce the great bulk of the power which turns the wheels of industry, welds the metal plates and parts, lights up the tasks of millions of war workers, dries the paints and lacquers, aids in the production and processing of food, and performs a thousand other jobs to give Uncle Sam the equivalent of hundreds of millions of obedient and faithful servants working 24 hours a day.

At the end of 1939 installed generating capacity in the industrial areas of the nation, where the munitions of war would be produced, exceeded the sum of the non-coincident peak demands on our power station by 40 per cent. Effectively this margin was even greater due to the network of interconnection between power plants and power systems, the diversity of whose requirements made the combined instantaneous peak demand substantially less than the sum of the non-coincident peak demands. The utility industry had trebled the amount of generating capacity since World War I. This margin of spare capacity with the subsequent addition of 15 per cent more generating capacity and the longer hour use of facilities due to going to two or three shifts in war plants has enabled the utility companies to increase their output over 70 per cent since the war began. Assuming no fuel shortage, they expect to be able to continue to supply all the power our country will need so long as the war lasts.

With due modesty, we in the electric utility industry are proud that we were able to perform our functions in the supply of electric energy to increase rapidly the production of war materials when the "sneak punch" came on December 7, 1941. Over the years, thoroughly sound engineering, accurate statistics and good business judgment prepared our companies for just such contingencies. We are continuing this type of long-range planning as it is inherent in our business.

But you are primarily interested today in what will happen tomorrow—after V-Day. What does long range planning disclose for our electric utility companies? How soon will additional generating, transmission and distribution facilities be needed? What is the outlook for further capital expenditures?

These are not easy questions to answer. However, there are some rough yardsticks which we can use to enable you to visualize what we in the industry must plan for.

At the present time about 40 per cent of the kilowatthour output of the electric utility companies is going into war industries and establishments and 23 per cent of the total revenue of these companies is coming from that source. Presumably the demand for power for war industry will largely disappear as soon as the fighting is over. Thus it would seem that the industry would some day find itself with a large amount of excess capacity on its hands. Contrary to what looks like a reasonable expectation, this is not probable.

In the three years before war broke out in Europe our power companies sold an average of 2,810 kwhr for every kilowatt of installed generating capacity. In 1943, 4,220 kwhr were sold per kilowatt of generating capacity, an improvement of 50 per cent, which as you see, alone accounts for most of the increased output of electricity. When we return to peacetime conditions we may expect the one-shift operation to return in most of the manufacturing plants and a return to a sale of, say, 3,000 kwhr per kilowatt of generating capacity. If this takes place, there will be a reduction in kilowatthours of approximately 30 per cent before there would be any excess of generating capacity, according to our peacetime standards of operation. Since practically this entire decrease will come

in industrial use, a reduction of approximately 50 per cent will take place in this classification, to an amount approximately equal to the industrial energy sold in 1939. The revenues of the power companies would be affected to a much less degree due to the low incremental prices of industrial energy earned through present long-hour use. From this, it is apparent that these companies as a whole do not have reason to expect a large amount of excess capacity after the war. There undoubtedly will be some locations where such is the situation but not so generally.

To give another indication supporting this view, the industry in the decade ending 1947 will have increased its generating capacity about 25 per cent. Such an increase spread over this period is less than what we in the industry have considered to be our normal rate of expansion. In fact, it now appears that by 1947 installed capacity of the utility companies will be about 3,000,000 kw below the normal long-term growth curve as of that year. Our residential sales of electricity have been continuing to make a healthy growth up to this moment, showing a 7½ per cent increase above residential sales last year. Retail commercial sale of electricity in spite of the closing of stores, the shutting down of signs and other conservation measures, stand at the present time 6 per cent above what they were a year ago. In a recent article appearing in the EEI BULLETIN, entitled "The Other Side of the Mountain," William M. Carpenter, economist of that organization, predicted that following the war industrial power would drop back in a year or so to its prewar level, but that the retail use of electricity would continue its longtime upward trend, and he anticipated that within three or four years after the war was over, industrial power would start on another period of real expansion.

It should also be kept in mind that during this war period little replacement has been made of obsolete and inefficient generating equipment. It is to be assumed that under healthy conditions much of this equipment will be replaced for base load operation, leaving the older and less efficient units for peak load and emergency purposes.

Outlook for Postwar Expansion

Before the war the business of electric utility companies was expanding at a comparatively rapid pace; residential and commercial uses of electricity especially so. The war instead of darkening the outlook has brightened it considerably. Many new discoveries in materials and manufacturing methods have cropped up as a result of war research. It will take years for the manufacturing industry to digest and utilize the more important of such discoveries and translate them into new products for sale at lower prices. These new developments make use of electricity to a greater and greater extent.

Home Electrification

Estimates based on surveys and other indications point to a substantial amount of home building after the war. Several large concerns are planning prefabricated houses on a broad scale. This is stimulating the usual builders to develop plans to meet the threatened competition. All building plans contemplate a high level of electrification to make the new homes attractive to the American family.

Companies long engaged in the business of manufacturing electrical appliances and those engaged in other lines of manufacture, seeking to utilize their new or enlarged factories after the war and to find employment for their war-swollen number of employees, are planning to manufacture and sell electrical appliances on a scale never before witnessed in this country. In addition to the well known appliances already in use to a considerable extent in American households, there are plans to produce at prices within reach of a large market, television sets, devices to clean, dry and cool air, and to assure better circulation and recirculation of air in the interest of heat economy, to produce deep-freeze units for food storage, and still further improvements in house lighting. A survey of large power companies shows that their promotion plans contemplate an increase in the residential use of electricity of more than 50 per cent in the next five years. Some companies are laying plans for and hope to double the residential use in the first five years after the war.

Commercial Establishments

The utilities' expectations for increasing the use of electricity in stores, restaurants, hotels and other commercial enterprises are even greater than their expectations for increase in the residential field, and their selling efforts will be aimed in this direction. Improved lighting and air conditioning will continue to play an increasingly important part in rebuilding sales for our merchants and business men.

Farm Electrification

At the present time 2,600,000 of the 6,000,000 farms in America are served with electricity. It is expected that in the first three years after the war another million and a half farms will be reached with electric service. In this same period about a million rural nonfarm homes will be reached.

But the biggest development in farm electrification ahead is expected to be a very large increase in the use of electricity on the farm, which at present averages 1500 kwhr per annum. More pumping systems to provide running water and to add irrigation for vegetables, pasture areas and for some important crops; feed grinders for the animals, and grain grinders for the family, deep-freeze units, and the application of electricity to many more jobs on the farm will result in marked increases in farm usage of electricity.

Large farms, such as dairy and poultry farms, have already gone far in electrifying their farm operations. Many use 6,000 to 12,000 kwhr per year. Efforts are now being directed toward making electricity more useful to the operations of the smaller farm so that the farmer can make better use of his time during the whole year and process or partially process much of his produce for the markets to sell it at much better prices. In these programs the utilities are combining their efforts with electrical equipment manufacturers, with farm equipment manufacturers, with agricultural colleges and government agencies interested in farm electrification, in order to give the farmer tools which take full advantage of electricity as a source of power. This is a long development process which has been going on for 25 years, but which appears now to be accelerating.

Industry Electrification

The modern war factories have applied standards of illumination far above the general level of factory lighting before the war. Undoubtedly these new standards will become common practice after the war. The war has greatly increased the demand for electric steel and for numerous alloys, chemicals and a great variety of synthetic products, all of which are large users of electricity. The electronic tube has opened the door wide for increased uses of electricity and the end of these developments is not yet

in sight. Within a few years after the war we expect to see the beginning of another big expansion in American industry and with it of course will go corresponding growth in the uses for electric power, and a need for funds for expansion of power system facilities.

Of course, all this picture of what can be done in the way of further expansion and development of American business and industry is predicated on our governing political philosophy—that it will be favorable to business initiative and incentive.

Future Construction

At this point I want to enter a word of caution against accepting extravagant predictions of electric power consumption in the early postwar period. For several years before the war, serious power shortages were regularly predicted, none of which has developed. Now come these postwar predictions, with all the earmarks of being designed to promote appropriations for additional Federal power projects.

Nevertheless even this conservative estimate of future business anticipates a wide expansion of the facilities of the electric utility companies which will require heavy construction expenditures. When will these funds be needed?

The length of the war will have an important influence on the date when utility construction will reach the proportions experienced in the period from 1938 to 1941. It always must be remembered that the utilities serve other businesses and industries and hence their expansion is predicated on an expansion of industry and business in general. The speed with which restrictions on critical materials are removed will have some effect on the time when America will resume its usual march toward broader and better horizons, but also the time required to digest and assimilate the new discoveries, methods and processes into industry and into the operations of the business field will require perhaps three to four years after restrictions on materials have been removed, and this is the time when we expect to see American industry and business expand again.

As mentioned before, of great importance will be the attitude of the Federal Government toward private industry and the free enterprise system, whether the government uses its wartime plants as a springboard to enter into more unequal competition with American industry or whether the government will proceed to dispose of its war plant facilities and foster the free enterprise system. If the present government policy is continued of expanding government power projects and encouraging state and municipal ownership of utilities through inequitable taxation and appropriation of Federal funds, the effect on the initiative and capabilities of the private companies is obvious. No business faced with increasing governmental competition can remain healthy under the weight of the present tax handicap.

The electric utility companies at the present time are paying 25 cents out of every dollar for taxes, 17 cents of which go to the Federal government. Our competitors, the Federal power authorities, municipal plants and cooperatives escape all Federal taxes and their contributions in lieu of local taxes are not on a parity with the local taxes imposed upon the utility companies. Their tax advantage is two-fold. They not only escape direct taxes, but because interest on their bonds is exempt from Federal income taxes, refinancing of municipal power bonds, for instance, has been accomplished in the past year at 1 to 1½ per cent. A bill is now before Congress, and has passed the House and is expected to pass the Senate, reducing interest charges on money borrowed by electric cooperatives from the Rural Electrification Administration to 1¾ per cent. They have been able to obtain from several state legislatures a property tax rate that is only 10 per cent of the tax rate on similar power lines of the electric utility companies.

The Tennessee Valley Authority has often been proclaimed by its proponents as a self-supporting, self-liquidating project that according to its first Chairman, Dr. Arthur Morgan, would amortize its total investment in thirty years including interest at 3 per cent. According to the present estimate of its Chairman David Lilienthal the Tennessee Valley Authority will return the entire investment, now approaching $700,000,000 in sixty years *without interest*. You gentlemen can judge what it has cost the taxpayer to furnish money to the Tennessee Valley Authority interest-free for 60 years.

Can Chairman Lilienthal predict that political pressure will not force further rate reductions to lengthen out this amortization period still more? In 10 years the estimate has already been lengthened from 30 to 60 years and the item of interest has been dropped out. Furthermore, the statement of $700,000,000 as the cost is far short of measuring what the undertaking has really cost the taxpayer, nor is it a statement of what the cost will be before many more years have gone by. Interest on the public debt is now one of the big items in the annual Federal budget. After the war its proportions will be much greater and every bit of interest on Tennessee Valley Authority money and all of the increase in the general overhead of the Federal Government attributable to this undertaking has found and will continue to find its way into the public debt.

There are now before Congress, and in process of getting there, many proposals for building more multiple purpose, so-called self-liquidating dams, including power generation. Whatever economic benefits can be obtained from such dams, that is dams for navigation, flood control, irrigation and power development can be reflected in the price of power sold by these projects to existing power systems and by them reflected in the rates to their consumers. In the nature of things the power available at multiple purpose dams cannot be fully utilized as a continuous source of reliable power. It is most economically absorbed in a large system with diversity of power loads and interconnected steam stations, or other diversified sources of power. It is clearly uneconomic to build duplicating transmission systems and steam reserves when these already exist.

There is no need for the Federal Government to engage in either the retail or the small wholesale electric business under present-day controls exercised by both Federal and state regulatory commissions. The private utility systems are regulated to operate at cost, including a fair cost of money invested in the business. The passing on of any savings from the government dam to the ultimate consumer could easily be assured by a clause in the contract for the sale of power to the effect that all savings to be effected by the use of energy received from such Federal development should be passed on to the ultimate consumer in such manner and amounts as would be determined by the regulatory authority having jurisdiction.

Under the American system the private electric utility industry has given our country the largest, finest and most efficient power system in the world. It

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Maintenance and Operation of Public Utility Automotive Fleets

By Jean Y. Ray

Virginia Electric and Power Co.

From a talk before the meeting of Electric & Gas Industry Accountants, Cleveland, Apr. 25-27

THE war, of course, brought a lot of headaches to the fleet operators, the same as it did in other departments in the electric and gas companies. Since we have had gasoline rationing, tire rationing, vehicle freezing and rationing, and inferior materials in replacement parts, we hear and read a great deal about transportation being in a very bad way; and we read also of the possibility of a breakdown.

That is quite possible except in the Public Utilities. Public Utilities fleets, in general, are in very good condition because of their possibilities of replacement of vehicles, and the fact that most of them had pretty sound maintenance programs. It is true that they are not replacing vehicles now the way they used to, and their fleets are getting older, but compared with the average fleet, the Public Utilities fleets today are in pretty good shape.

Maintenance, of course, played a big part in their being in the condition they are. We are going to have to continue the maintenance program more than ever because it is going to be a long time before we are going to get any equipment, in spite of the fact that you read that the WPB would provide some trucks for civilian users.

This year it is very doubtful, in my mind, that we are going to get many of those trucks. The Army comes first —or rather, the Armed Services come first—and the factories will have all they can do with their present manufacturing capacity to meet the Army orders without having anything left over for the civilians.

For this reason it is going to be necessary that we take even better care of what we have. However, there is a little silver lining in the cloud. Realizing that it will probably be impossible for civilian fleets to get any vehicles to amount to anything this year, the Office of Defense Transportation has worked out what they call a rehabilitation program. The idea is to replace motors or rear axles, or other component parts, putting a lot of life back into the equipment you now have. This will enable you to use it for three or four more years.

Under this new order, every operator who has 25 vehicles or more, is entitled to get, without any priority rating or any restrictions, one motor, one transmission, and one rear end for each vehicle that he has. This may be used as a spare, and will enable you to have something on hand when your present motor wears out, or you have rear end trouble. In that way your vehicle won't be tied up too long.

Under this program, you can take the motor you pull out and change it for a rebuilt motor. That will be helpful in keeping your present equipment going.

There is one other point to bear in mind in connection with that replacement program. Of course, the manufacturers of the small units—that is, the "Big Three," Ford, Chevrolet, and General Motors—will go into this motor program pretty strong.

There are only 137,000 of these motors going to be built. The number of transmissions is 8000 and only 3800 rear axles. That is quite a small unit, but it is a quotation that will give us a chance to pyramid that into quite a bit more than that amount.

The manufacturers of larger trucks are not taking very kindly to this program at the present time, because they don't want to have, after the war, a lot of motors on their hands as the model may possibly be changed.

My advice to you would be to order the spare motors that you are entitled to, right away—particularly the larger sizes. If the manufacturer of the larger size motors sees these orders coming in, he is going to take an interest in the program, and build these motors. If he doesn't see the orders, he is not going to exhibit any interest.

The replacement parts situation has improved a little, too. With the exception of some parts, such as cylinder heads and crank shafts and gears, they are still tight, because the Army is taking everything it can get its hands on. But the other parts are coming through much better, and they are made of improved materials.

For instance, the war-time or "Victory" valve, that we had to use in our motors has been thrown aside and we are permitted now to get just about the same material for valves that we had before the war.

In addition to that, the WPB has agreed that 5 per cent of the manpower hours used in making spare parts should be set aside for civilian use.

In connection with the replacement of vehicles, the Public Utilities are in a pretty bad spot because most of the vehicles scheduled for production this year are in the medium and heavy duty class. We made an attempt to argue for some four or five thousand, but the Army representatives, who sit in on all these WPB meetings and keep their finger on the pool of available material, decided that they were going to get rid of their light equipment which hadn't proved satisfactory. They suggested that perhaps the Utilities could use some of this surplus Army equipment.

My advice to you is, "Don't fool with it." In the first place, the popular jeep, which everybody hears so much about, is a most expensive piece of machinery to use. It has two drive axles, and the front axle is going to cause a lot of headaches. Now the jeep may have its place in a Utility fleet patrolling or something like that, but you will find that it is not a very good idea to go in for this surplus Army equipment. Much of it has been pretty well abused. Much of it is old, and you would have considerable trouble getting replacement parts. And much of it certainly is not economical to use.

Now, on the tire situation. Probably you will be able to get what you need in the way of passenger tires. Even

(*Continued on page* 196)

The Depreciated Original Cost Rate Base

By C. E. Packman

Controller, Middle West Service Company, Chicago

Presented at Meeting of the Electric and Gas Industry Accountants, Cleveland, Ohio, April 25-27, 1944

IT would seem that two things are implicit in the title of this paper. The first is that the term indicates a net figure which, therefore, requires separate discussion of its components; the second is the implication that such a rate base, excluding all other factors, is acceptable—which I reject.

Before one can talk about depreciated original cost he must, perforce, talk about gross original cost. To the extent that a gross plant figure is an element in the rate base, there would appear to be no injustice in the exclusive use of gross original cost in the case of a utility starting from scratch. By that is meant a utility which has either constructed its plant, or purchased it at original cost, and whose capital structure, except for the effect of the raising of initial working capital, bears an appropriate relationship to the sums so invested in plant. Accepting the formula outlined in the following pages, there seems to be no reason for objecting to the use of gross original cost as the gross plant element in the rate base.

Where in the past, however, plant has been purchased at a reasonable price in excess of original cost, whether with the stamp of regulatory approval or without, the utility is fairly entitled to the inclusion of such amount in the rate base, in addition to gross original cost. This seems clearly indicated in respect of transactions at arm's length. Where the excess has arisen in connection with a transaction between affiliates, a greater degree of caution is required. One would scarcely expect to find a justifiable excess in an overnight transaction between affiliates. However, where one affiliate operates a property for any appreciable length of time, during which period the value can be shown to have enhanced, there would seem to be no reason for differentiating a sale to an affiliate from a transaction between non-affiliates. It would seem that the rights of senior security holders, not possessing control, might be seriously impaired if such property were not transferred at its enhanced value, and that a management chosen by the junior security holders possessing control would be derelict in its overall duties if it did not secure value received for the property sold.

I find myself somewhat out of patience with those who hold that original cost is appropriately the sole and exclusive plant element to be considered in the rate base. In connection with these costs above original cost, there comes to my mind the picture painted in the annual report of one of the companies in the group with which I am associated. This was a showing, in map form, of the territory served in 1943, as compared with 1913, a period possibly approaching the equal of, but certainly not exceeding, the life span of a complete utility property as we know it today. In 1943, this company served 305 communities, practically all of which were fully interconnected in one system and enjoyed reliable unlimited service. In 1913, 211 of these communities had no service at all; 48 of them had doubtful part-time service; 46 had full-time service; none of those having service were interconnected but were at the mercy of small isolated plants, uncertain in operation.

Now, what happened in this interim of thirty years? It is no secret. All of us in this business know about it and yet it sometimes seems that by our very passiveness we acquiesce in accepting the mark of reprehensibility which some have undertaken to place upon it. What happened is that the pioneers of this industry had vision enough to see that the people in the America of the future would not be content with unreliable service from isolated plants; they had faith and courage enough to invest their money in attempting to reduce that vision to reality. They bought up these isolated plants and distribution systems; they built great transmission lines and huge central stations. In many cases the transactions were repetitious, as the lesser pioneers gave way to the greater ones, until today we have such systems as the one of which I speak, serving its consumers at the lowest prices that have ever prevailed in all that span of years and so efficiently that those same consumers take it all for granted and forget the hardships which existed at the beginning. I sometimes think that most of the complaints of the industry would be silenced if, as a reminder, the industry were privileged to pull its switches for an hour or two once a month, say, early on a Saturday evening.

But to get back. This process, of course, entailed the payment of sums in excess of original cost. The earlier of the pioneers felt that they were entitled to some fruits for their labors; the later ones had faith in their larger visions of the ultimate boons to consumers. Of course, they hoped to make a profit for themselves and for that they should not be irrevocably condemned. Surely, the thinking of those regulatory bodies which approved these transactions must have conformed to this pattern of the future.

But, to some recent thinkers, apparently all of this was wrong. We are now told that original cost is the only fair measure; that there is no justifiable cost other than original cost; that original cost is not what it is in fact but rather is something determined by the manner in which somebody accounted for it years ago or is something that someone, who may never have seen a post set or a conductor strung, says it is; that anything paid in excess of original cost was plunder to the recipient and the result of censurable procedure on the part of the purchaser; that any such cost in excess of original cost is an intangible rooted solely in excess earning power; that it should have been disposed of long ago; that because it wasn't we should now be pleased to receive a short further period in which to dispose of it, but that any balance undisposed of cannot be a part of the rate base nor can any amortization of it be allowed as an operating expense in the computation of return, ad infinitum.

Those who make these allegations should be reminded that neither Rome nor the present utility systems were built in a day; that no great industry has ever reached maturity without suffering growing pains; that it is lots easier to destroy than to create and that the spirit

of simple fair play should dictate the answer to this question. Personally, I think that these costs should be a permanent part of the rate base, and I know that many of you agree with me. On the other hand, if the great minds of those who are guiding us to the promised land say not, then I think it incompatible with their claims to greatness for them to display a total lack of one of the principal attributes of greatness. They should unhesitatingly concede the inclusion of any undisposed-of balance in the rate base, as well as the amortization in operating expenses.

With respect to the accrued depreciation to be deducted from gross original cost so as to reach depreciated original cost, it is assumed that the term contemplates what some call the balance of amortized cost, or the accounted-for depreciation, rather than the so-called actual depreciation, or depreciation in fact. At least I shall discuss it on that basis. Much has been written about the injustice of requiring the deduction of the accrued depreciation. It has been pointed out repeatedly that this process gradually eliminates the rate base in static properties and that even in growing properties the same effect is only obscured, unless the funds generated by depreciation charges can be fully invested in new plant or otherwise. In fact, I have been accused of advocating such a rate base. Perhaps there has been some method in the madness of those who chose this subject for me. However that may be, I appreciate the opportunity of clarifying my position.

It is fully appreciated that the use of a rate base, confined exclusively to depreciated original cost, will in some cases ultimately result in no rate base or in a constantly declining rate base until replacement occurs, when the process will be repeated. The pinch comes because of the lack of investment opportunity, which lack is the result of other philosophies of those producing the new order of the day.

Much has been said about return of capital versus return on capital. I am inclined to agree with those who reject the assertion that depreciation funds are a return of capital. Certainly, so long as the obligation to render service continues, the funds are frozen in the business and cannot be distributed to investors in liquidation. They are insurance against the liability for replacement. It seems that the same reasoning must cause the rejection of the theory that these funds are a return *on* capital. If they were, they ought to be distributable in the form of dividends. But they are not distributable in either form. Accordingly, it would seem that we must reject both (a) the assertion that the reserve must be deducted because it is a return *of* capital and is the equity of the consumer and (b) that the reserve should not be deducted because it is a return *on* capital and is the equity of the investor.

But all of this argument about return *on* capital and *of* capital seems to settle nothing. As an element in the rate base, the sum invested in plant, or what I call the *plant capital* is similar to the *working capital*. Out of the working capital the utility expends funds for the purchase of coal to fire the boilers. The expenditure is allowed as an operating expense and no reduction in the predetermined amount of working capital is required. Against the plant capital the utility provides for the liability of replacement in the form of depreciation. The new philosophers agree that this provision should be allowed as an operating expense but they shy at letting the plant capital remain without diminution except to the extent depreciation funds are used for the ultimate purpose, i.e., replacement. To the extent of the balance they say the plant capital must be reduced.

To me this is not sound rate regulation. It leaves management in the position of being unable to produce a fair return for investors because of the inability to appropriately invest these funds. During some periods in the past it was possible to invest safely at an approach to a fair return, but the economics of today prevent this. It seems unfair that management should bear this burden alone. It is a joint responsibility of regulatory authority and management. So far as management prudently meets the challenge and discharges its responsibility, the investor should not suffer; so far as management cannot do so, the result should be a burden of the consumer and a part of the cost of the service supplied to him.

Therefore, to the extent that depreciation funds are not (a) used for their ultimate purpose, namely, replacement, or (b) are not prudently invested to advantage, the balance should operate to reduce the deduction from the rate base, or should be included in the gross amount of the rate base. Perhaps this is not a new solution; perhaps it is merely saying in another way what others, much better entitled to speak, have been reiterating. Nevertheless, I venture to offer the following solution as a variation, in the interest of greater simplicity. The rate base shall consist of three elements as follows:

1. *Net Plant,* consisting of gross plant, as previously defined herein, less reserve for depreciation, appropriately computed.
2. *Working Capital.*
3. *Idle Depreciation Funds,* consisting of the reserve for depreciation, less the amount thereof invested and producing return.

The problems incident to the initiation of the program relate principally to companies which have but recently adopted depreciation accounting practices and particularly in connection with the third element in the formula. In determining the amount of depreciation funds invested in new plant it seems, in the case of such companies, that plant and depreciation figures used in computing this element may properly have to be frozen as of the date of adoption of depreciation accounting. However, if regulatory authority will concede the fairness of the proposal and adopt it, there would appear to be no reason why such initial figures could not be developed and agreed upon.

The first element in the formula, namely, Net Plant, will automatically be accounted for in the balance sheet once the determination of the items to be included in gross plant and the proper basis for computing the depreciation reserve are made. The second element, Working Capital, would continue to be a matter of agreement according to changing requirements and involves no particular difficulties. The third element, Idle Depreciation Funds, requires further discussion.

I have been unable to find the answers to all of the problems involved in the handling of this element within the time at my disposal. However, I will give you the results of the analyses which I have been able to make, with the resulting observation that I am convinced of the soundness of the formula. In seeking to apply tests to a broad base, I started out with the reports of the Federal Power Commission on statistics of electric utilities in the United States. These reports have been issued annually for a period commencing with the year ended Dec. 31, 1937. I sought to end the test period on Dec. 31, 1941, so that it would not be distorted by the unusual conditions arising as a result of

the war. However, the figures contained in these reports did not adapt themselves to the tests except in one particular. They did show that the increase in the reserves for depreciation and amortization of utility plant of all Class A and B electric utilities in the United States for the period from Dec. 31, 1937, to Dec. 31, 1941, was fully invested in new plant for, notwithstanding the fact that the plant figures included all of the net amounts which the Federal Power Commission is attempting to assign to accounts 107 and 100.5, and which includes all writeoffs thereof, the aggregate plant has increased in an amount greater than the increase in the reserves. This would seem to indicate that there are no idle depreciation funds in the industry as a whole; that the industry is not static, and that utility management is able to fully invest all depreciation funds in new plant.

Accordingly, it was necessary to use cases based on assumed conditions. For this purpose I have made two tests, both on the basis of a hypothetical company which is perfectly static. This is the same hypothesis on which most of the horrible examples are based. It is the extreme case, yet the application of the formula produces eminently satisfactory results.

The first test of the formula was applied in the case of a hypothetical company which would be absolutely static and which would have a plant account of $1,000,000 financed in full by the sale of capital stock. The plant has an estimated life of ten years, during which there will be no additions or retirements. The rate of allowable return is set at 5 per cent. It is assumed that in order to assure availability of funds to replace the plant at the end of the period all of the depreciation funds will be invested in Government securities at an interest rate of 2½ per cent. To simplify the illustration, the second element in the rate base, Working Capital, will be ignored.

For the first year the rate base will be $1,000,000, consisting of the initial sum invested in plant. For the second year the first element in the rate base will be the net plant which will be $900,000, consisting of gross plant of $1,000,000 less $100,000 of depreciation reserve. For each succeeding year the net plant will be reduced $100,000, being the annual accretion to the depreciation reserve.

Referring now to the third element in the rate base, Idle Depreciation Funds, I will give you the computation under the formula for the second year of operation. The amount of cash impounded by the depreciation provision and invested in Government securities at 2½ per cent and which corresponds to the reserve for depreciation in this case, is $100,000. This must be reduced by the amount invested in Government securities adjusted to the allowable rate of return. The adjustment is a simple one, consisting of the finding of what amount invested at 5 per cent will be equivalent to $100,000 invested at 2½ per cent. Naturally, $50,000 invested at 5 per cent is equivalent to $100,000 invested at 2½ per cent. Therefore, the effective investment at the allowable rate of return is $50,000. Deducting the amount effectively invested, $50,000 from the full amount of the depreciation fund leaves a balance of $50,000 thereof which is idle and which must be added to the net plant of $900,000 in order to reach the rate base. The rate base is therefore $950,000 for the second year.

The allowable return of 5 per cent on a rate base of $950,000 is $47,500. The return on $100,000 of Government securities at 2½ per cent is $2,500. Taken together they produce $50,000 which, in terms of net income to the company, is exactly equal to a 5 per cent return on the original rate base of $1,000,000. Thus the application of the formula produces net income to the company of the same amount each year and the company is able to pay dividends of 5 per cent on its capital stock.

At the end of the 10-year period the plant will be completely depreciated and can be retired by charge against the reserve for depreciation. The company will have $900,000 of Government securities which, presumably, can be liquidated at par and this, plus the amount of $100,000 impounded by the last year's depreciation provision, will make a total of $1,000,000 with which the company can thereupon replace the plant and start the process over.

Setting this illustration up in terms of the formula as of the sixth year, using figures as of the end of the fifth year, we find the following computation of the rate base:

1. *Net Plant*		
Gross Plant	$1,000,000	
Reserve for Depreciation	500,000	$500,000
2. *Working Capital*		
3. *Idle Depreciation Funds*		
Reserve for Depreciation	500,000	
Amount invested in Government securities, $500,000, at 2½%, reduced to an equivalent amount invested at the allowable rate of return equals $250,000 invested at 5%	250,000	250,000
Rate Base		750,000
Allowable Return at 5%		37,500
Income Account		
Net Operating Income before Depreciation		137,500
Less—Depreciation Provision		100,000
Net Operating Income		37,500
Plus—Interest on Government Securities		12,500
Gross and Net Income		50,000
Dividends on Capital Stock		50,000

The second test of the formula was also applied in the case of a hypothetical company which would be absolutely static and which would have a plant account of $1,000,000. But in this case the plant would be financed by the sale of $500,000 of 4 per cent bonds and $500,000 of capital stock. The plant has an estimated life of 10 years, during which there would be no additions or retirements. The rate of allowable return is 5 per cent in this case also except that it is based on the average of the bond money, 4 per cent, and the assumption that the capital stock should receive 6 per cent. It is also assumed that at the end of each year, $50,000 of the cash impounded by depreciation charges will be used to retire that amount of bonds so that at the end of the 10-year period the bonds will be completely eliminated.

In this case the calculation of idle depreciation funds can be made in two ways. If it is to be assumed that, as the bonds are retired, the capital stock takes on a stronger character and is therefore not entitled to as high a rate of dividend, then the deduction to be made from the gross amount of depreciation funds, to determine the idle amount, will be made

at the par of the bonds. By that process the amount available for dividends on the stock will be ratably reduced each year so that in the eleventh year it would have been possible to pay only an amount equal to the allowable rate of return of 5 per cent.

If the deduction to be made from the gross amount of depreciation funds, to reach the idle amount, is equalized from 4 per cent, the interest rate of the bonds, to 5 per cent, the allowable rate of return, just as was the amount invested in Government securities equalized in the first illustration, then the net income available for dividends on the capital stock will be kept at an amount which will permit the payment of dividends on the common stock uniformly in each year at 6 per cent.

As between the two, I have made the deduction from gross depreciation funds at par so that the return on the common stock is ultimately reduced to 5 per cent. Many will assert that the other route should be taken. In many cases, however, the elimination of bonds or the refinancing thereof at lower interest rates is a management achievement, in which cases a basis should be found for the sharing of the benefits between the consumer and the investor.

At the end of the 10-year period the plant will be completely depreciated and can be retired by charge against the reserve for depreciation. The company will have $500,000 of cash and will have no bonded indebtedness. In a case of this kind it must be visualized that to secure the additional cash necessary to replace the plant new bonds will have to be sold to provide the funds which have been used during the first life cycle to retire the $500,000 of bonds which were sold in the first instance to partially finance the plant. The process then will be repeated.

Setting this second illustration up in terms of the formula as of the sixth year, using figures as of the end of the fifth year, we find the following computation of the rate base:

1. *Net Plant*		
Gross Plant	$1,000,000	
Reserve for Depreciation	500,000	$500,000
2. *Working Capital*	.....	.....
3. *Idle Depreciation Funds*		
Reserve for Depreciation	500,000	
Amount to be used to retire bonds at par	250,000	250,000
Rate Base		750,000
Allowable Return at 5%		37,500
Income Account		
Net Operating Income before Depreciation		137,500
Less—Depreciation Provision		100,000
Net Operating Income and Gross Income		37,500
Less—Interest on Bonds		10,000
Net Income		27,500
Dividends on Capital Stock		27,500
Rate of Dividend		5.5%

In this second illustration, it will be noted that only one-half of the depreciation funds has been used to retire bonds. It is possible that the management would desire to invest all or some portion of the other half of these funds, permanently or temporarily, in Government or other securities. In case any part of such funds are so invested, for all of the period for which the rate base is being computed, an additional deduction will be necessary from the gross amount of the depreciation funds, so as to reach the idle amount, but in such case the deduction would again have to be equalized to the allowable rate of return. In case such funds are temporarily invested, the proper result will be attained by not making such deduction but by including the interest received on such temporary investment in the actual return. Inclusion of the income from temporary investments in the actual return, for comparison with the allowable return, will produce the right answer in all cases, of course.

It should be very clearly understood that neither the rates of return nor the dividend rates on stock which I have used in my examples bear any relationship whatsoever to my convictions of what are fair rates for these purposes. They are used for illustration purposes only, because they lend themselves to ease of computation.

As stated earlier herein, the Federal Power statistics show that the industry generally is not static but that, on the contrary, it is constantly growing and that full opportunity for the investment of depreciation funds in new plant is always available. To the extent that individual companies conform to this pattern, my analysis proves that the deduction of the reserve for depreciation from gross plant will produce no inequities. To the extent that companies are permanently or temporarily static, the use of the formula will avoid any inequities. It is admirably adapted for use in connection with automatic rate adjustments, such as are contemplated in the New Jersey and Arkansas plans. In static companies rates can be set at the outset and consumer dividends used in the interim so that in the second life cycle no adjustment of the basic rates is necessary. It is more simple than the various interest formulas; it recognizes and equalizes the risks involved in both the supplying of capital by the investor and the responsibility undertaken by management and it does not penalize management and the investor for conditions that are beyond their control, and here I have in mind, particularly, the lack of investment opportunity which exists today and which may continue to exist. I commend the above to your consideration.

Broadened Horizons

(*Continued from* 167)

has furnished the stimulus for the electrification of industry, a process which has contributed immeasurably to the high productivity and the accompanying high standard of living of the American workman. It has played no small part in the successful promotion of our war effort. It has been built and financed in considerable part by the savings of your depositors who in turn have been paid fair wages for the use of their money.

If private enterprise is encouraged in the postwar period, and the threat of government competition tempered, and we believe this to be the sentiment of the majority of the American people, the private electric utility business will continue to play its important part in the economic development of this country. Broadened horizons lie ahead for electric power and with them broadened opportunities for private investment in the utility business.

Utility Approach to the Farm Market

By Walter H. Sammis

Vice-President, The Commonwealth & Southern Corporation

Address before the Annual Commercial Meeting, EEI, Chicago, April 3, 1944

THE farmers, for centuries, have been the backbone of civilization, providing food—the most necessary element of life. In general, farming has not been surrounded with the romance that has been characteristic of some other forms of industry but with the availability of electric power, indications point to a change in this situation.

The production of raw agricultural products, the usual business of the farmer, has always been accompanied by a resultant production of unsalable wealth in the form of by-products. Generally, the producer of raw products receives a lower profit basis than those who process and distribute the finished product to the consumer. Electric power is the first form of power on the farm that gives promise of reducing the time and labor of finishing raw products, whether the prime products or the by-products, so that the farmer will find it attractive to process or semi-process the raw materials and then sell through more direct channels than formerly to the consumers, thus leaving a greater share of the overall profit on the farm. Great strides in this field may follow the availability of equipment and such operations as sorting, grading, packaging and storing may become common practice on the farm.

Almost 40 years ago the electric utility companies started extending distribution lines into farming areas. The early developments were directed simply toward making electric service available. By the early nineteen twenties it became clear that the availability of electricty was only part of the overall picture. This period was the turning point. Thorough study on the part of many interested groups had established that there were four basic parts to the sound development of farm electrification.

1. The determination through investigation and research as to how electricity could be used advantageously and economically on farms.

2. The development of proper electric equipment to perform farm tasks.

3. The building of lines into farm areas to make electric service generally available.

4. The promotion of the use of the service by farm customers.

Once the problem was crystallized, steps were taken which laid the groundwork for the future. Progress was slow at first but gradually gathered momentum and reached a peak shortly before Pearl Harbor.

With the advent of war there was an initial tendency due to critical material and manpower shortages to stop all further farm electrification, both in the building of additional farm lines and the manufacture of utilization equipment. However, these very shortages dramatized the part electricity plays in reducing heavy burdens and increasing the output on the farm.

While the war effort has retarded farm electrification as a whole, it has on the other hand stimulated unusual progress in research and investigation as to how electricity can be best utilized on the farm.

As a result of this progress, following the war the emphasis will be on building more farm lines and promoting greater use of electric service. To meet this challenge, all of us will have a two-fold responsibility.

First: To provide service to as many farms as is financially feasible.

Second: To make farm customers profitable to the utility by intensively promoting this market so that even more extensions can be made.

Now is the time to prepare to meet these responsibilities.

Farmers, in general, have just had a taste of the advantages and economies of farm electrification. Nevertheless, this taste has aided in the largest food production of all time from the 364,000,000 acres of farm land planted in 1943 with a farm labor shortage of 2,500,000 pairs of hands.

Postwar the farmers will probably be in the best financial position since the early twenties and they will probably be desirous of making farm and home improvements that for years they have been unable to make because of lack of capital.

The electrification of the farm offers a broad field of possibilities for postwar for the farmer, the equipment manufacturer and the utility. According to the 1940 census, 22 per cent of our population lived on farms. Farms in 1942 produced 9.2 per cent of our national income. Such a large segment of our population devoting their energies to the production of food can be and should be aided by the benefits of electricity.

Today there are approximately 2,660,000 farms in the United States receiving service. There remain unserved 3,500,000 farms, some of which are so far remote from their neighbors and the existing electric lines that the solution to their electrification problem will probably be through small individual gasoline or oil engine sets.

The initial rigid war restrictions are now being liberalized and present indications point to them beng lifted entirely before the end of the war. The Edison Electric Institute reports that the electric utility companies can build approximately 40,000 miles of extensions to existing lines, involving an expenditure of approximately $50,000,000, which would serve approximately 175,000 additional farms as soon as materials are allocated by the War Production Board.

It would seem advantageous, with the easing of the manpower situation, for each utility at this time to survey the situation in the territory it serves. Contracts for service, as soon as material becomes available, could be made and right-of-way obtained where necessary. Arrangements could be worked out with wiring contractors so that the farms could be properly and adequately wired.

Each utility could review its present extension policy to determine if more liberal conditions can be extended in the interests of the farmer. Likewise, perhaps some of the intricacies of minimum guarantees and length of time of guaranties might probably be simplified without too great a loss in revenue and with accompanying better understanding by the prospective customers.

The utilities have done an outstanding job in bringing service to those farms already electrified. Millions of dollars have been invested in facilities which, in general, are just beginning to show some return but yet not a reasonable amount.

However, there has been a few years' breathing spell and, undoubtedly, most utilities can now digest additional expenditures in farm lines. Further, the probability of these farm lines paying their way looks better and better each year. Studies indicate that, in general, the revenue per farm must reach about $75 per year to break even considering all costs, including the cost of capital. This goal does not seem to be too far away based upon accomplishments in isolated instances. However, the problem is not simple and easy of solution. It involves engineering, economics and social conditions and, above all, patience and hard work.

First—Cooperation between the farmer, the equipment manufacturer and the utility is essential. Such cooperation has been assisted in the past through the excellent efforts of agricultural schools, colleges, universities, state experimental stations, county agricultural agents, county home demonstration agents, 4-H Clubs, state committees on Relation of Electricity to Agriculture, the American Farm Bureau Federation, The National Grange, the American Society of Agricultural Engineers, the Farm Machinery Institute, the National Electric Manufacturers' Association, the Edison Electric Institute, the United States Department of Agriculture and other governmental agencies, farm and electric publications, and others. This cooperation should be continued and intensified.

Second—The equipment manufacturers and utilities should learn more about the various farm operations and develop specific equipment designed for specific farm applications. The farmers have a wealth of ideas as to ways in which electricity may be used, but the application should be made more expertly than simply endeavoring to crudely electrify existing equipment.

Third—The successful applications of electricity to the specific farm operation must be brought more forcibly to the farmers' attention through the further intensified assistance of the agencies previously mentioned and the development of new approaches and contacts.

Fourth—Coordinated activities such as the Water Systems Council and the Adequate Wiring Bureau have been most helpful in the past. Efforts should be made to expand and increase these activities to cover the entire field of farm electrification applications.

Fifth—The equipment manufacturers directly and through their dealers, as well as the utilities, should have adequate and good quality representation to visit and assist the individual farmer, to organize group meetings and farm demonstration, to conduct electric schools and to work effectively with other individuals and organizations in the furtherance of farm electrification. Improved practices in the selling and servicing of farm electrical equipment should materially stimulate its use on the farm.

Sixth—The utilities and equipment manufacturers should make available additional promotional material, such as pamphlets and bulletins, sound slide films, motion pictures, etc., on the various phases of farm electrification to supplement the personal contacts and demonstrations.

Such a program not only involves manpower, but properly trained manpower and ingenuity. For illustration, the electric utility's representative, a few years ago, induced farmers to try raising celery along the banks of the Muskegon River near Muskegon, Mich. Unfortunately, at times, the river rose and flooded considerable acreage. The utility farm service representative worked out a float switch device in connection with a motor which automatically unwatered the land following the river risings. Muskegon has gained in celery production so that it is now either crowding first place or in first place in the state in output of celery.

One could enumerate instance after instance of such unusual situations. Farm and electrical industry publications are anxious indeed, to give publicity to just such accomplishments and if each of us will contribute a bit here and there, much good will result for all of us.

In approaching farm electrification, too often the farmer is encouraged to spend his first money electrifying his home with desirable appliances to make life more comfortable. This may result in the farm operations waiting for the next bumper crop. In my opinion, the process should be reversed. Let electricity on the farm earn the economies which will permit the full electrification of the farm home.

During this war period the market value of live stock, particularly the dairy herd, has materially increased. This situation will carry over into postwar, at least until the herd, for illustration, has been built up to prewar standards. This justifies giving more attention to the health of live stock in such ways as proper ventilation, more cautiously prepared food such as the curing of hay, proper temperature of water, etc., in which electricity can play an important part.

From the viewpoint of sustained income to the farmer, the utilization of present farm by-products or farm crops grown specifically for industrial uses should not be overlooked. The National Farm Chemurgic Council, organized in 1935, seeks to advance the industrial use of American farm products through applied science. Sufficient progress has already been made in the field of chemurgy to leave no doubt that agriculture is on the threshold of one of its most revolutionary developments. For illustration, 25 years ago the soy bean was little known this country. In 1942, over 9,000,000 acres were planted in soy beans, and its uses are so extensive in industry that it is called a "miracle" crop. Casein, a by-product of skim milk, in the form of plastics, paper sizing, indoor paints and fiber for clothing is an example of the industrial utilization of by-products on the farm. Kapok, insulation, plywood, alcohol, synthetic rubber and other products promise wide industrial uses for waste farm products, such as weeds, straw and cornstalks.

The uses of electric lamps for purposes other than illumination are just beginning to be recognized. Filament lamps for accelerating the growth of seedlings to permit earlier planting; ultraviolet light for better growth of poultry and confined animals; short wave ultraviolet to combat plant diseases, notably prevention of mold on seeds; the sterilamp for reducing the bacteria count in milk; and infra-red lamps for dehydration of fruits and food products and for the brooding of chicks and pigs; are typical of recent developments.

The electrification of the farm, with its accompanying reduction in some of the heavy chores and hours of work and electrification of the farm home with storage freezers and television just around the corner, will certainly add materially to the attractiveness and enjoyment of life on the farm and will create greater appeal to those returning from the armed forces.

In conclusion, it is sufficient to say that farm electrification is in its infancy. It promises greater production, greater income and better living conditions for the farmer. You gentlemen can do much to bring about that change more rapidly.

Opportunities—A Challenge to Power Men

By E. L. Kavanaugh
The Detroit Edison Company

Presented before the Annual Commercial Meeting, EEI, National Power Sales Section, Chicago, April 3, 1944

"OPPORTUNITIES"—what a much abused word. The unabridged definition is—a combination of circumstances which makes certain action possible with probability of success by using vigilance, tact, force, and persistence. How well that can apply to us in our endeavor to increase our industrial kilowatthour sales and protect ourselves from competitive sources. The *opportunities* that confront us are great in number, and the available new loads potentially large. But in order to derive the maximum benefit from them, a vigilant and aggressive effort on our part will be definitely necessary.

Where have we been? Where are we now? And where do we go from here? A brief thumbnail review of our experiences and the developments of the past should provide a helpful perspective for appraising the effect of the present war, on the future or postwar industrial business. This perspective, I am sure, will indicate that we can expect to face entirely new problems that should be approached with new knowledge and new understanding—changing our formerly accepted methods where necessary.

There is no reason to suppose that the exact pattern of events that happened after the last war will be repeated. Nevertheless, general observation proves that wars initiate rapid and extensive changes that do affect all industry. In our own business prior to World War I the growth of the use of our power in manufacturing plants was rather slow but the end of the war found us with: a rich and fertile market in the form of isolated plants; electrical melting and heat-treating of metals; fuel-fired furnace equipment that was poorly designed and inefficient.

Today, the isolated plant market has been pretty well absorbed. Fuel-fired furnace manufacturers have improved the design and efficiency of their equipment and have well established themselves in the metal treating field. Furthermore, the internal combustion engine has entered the industrial picture. Yes, gentlemen, our opportunities are there, but our selling problems have changed. Those problems have become greater in number and more difficult to contend with—a real challenge to the Power Man.

During the ten-year period just prior to this war, 1930-1940, our selling job changed a good deal and passed through a development period. During this decade we found many new applications for our service in the industrial plant. We played a major part in the development and growth of the use of the infra-red source for heating and drying. Induction heat for forging, hardening, annealing, stress relieving, brazing, and melting was studied and further developed. The number and size of metallic resistor furnaces as well as the electrode salt bath continued to grow. Stimulated by the war demands these relatively new developments were given wide acceptance and it is reported that close to a million kilowatts of heating load were sold from 1940 to date. The expanded use of this equipment and our knowledge of the highly efficient results obtained from them are of inestimable value and should stand us in good stead in our future planning of increased sale of electrically heated equipment in existing as well as new plants. Improvement in application and development in welding, resulted in broad expansion of its uses and contributed a good deal to the war effort. Practically every day witnesses an extension of the use of welding and the speeding up of production. Ships, tanks, gun carriages, and bombs are now welded and there is practically no metal fabricating industry that does not use welding in one form or another.

Advances in the use of electrical power and heating equipment in industry, during the last ten years paralleled the advance in design of *illuminating systems* for all plants. The marvelous growth of industrial production and the intricate problems of inspection demanded a closer examination of seeing conditions and a real appreciation of the importance of light and lighting—prior to that time it had been considered as merely a means of replacing darkness. General levels of 10 to 15 foot-candles were considered very good and entirely adequate. The incandescent and gaseous discharge sources of light were in the development stage and the knowledge of the reaction of human beings to various intensities of light were just beginning to filter into the work world.

The advance of the last few years has been the most significant in the history of artificial light sources. The oft-demanded "Cold Cathode" is now a reality. Efficiencies have doubled, lamp life increased, and the knowledge and appreciation of the use of high levels have increased accordingly. In comparison with the 10-15 foot-candles ten years ago, general intensities of 60, 75, and 100 foot-candles are common in many production plants today. Intensities of 30 to 50 foot-candles are fairly average. These levels are almost entirely obtained from gaseous sources whether they be hot cathode fluorescent, cold cathode or high intensity mercury. These levels are being obtained economically as well as with a minimum of radiant heat which raised real problems in many cases during the incandescent days. Fluorescent lighting means "more lighting miles per gallon." This is what the Power Man wants for his customers, but we must protect those customers and ourselves from the purchase and installation of inferior equipment. It is particularly true today because there are at present those who are selling fluorescent equipment whom we might call "opportunists" and who are *not* particularly interested in good design *nor* in the sale of acceptable equipment.

When a sudden demand is created for a new product how much thought should be given to developing the "know-how" to properly advise in the matter of its design and application. This development in knowledge, experience, design and application of fluorescent lighting in industry now becomes an additional responsibility of the *power sales personnel*. The demands of war plants for improved lighting resulted in illuminating engineers finding interesting and permanent solutions that will continue to be valuable long after the war is ended.

Our industrial customers are depending more and more on the Power Man for authoritative and impartial advice. In the past we have had to develop a knowledge of production methods and processes, along with many other phases of industrial plant operation. With light becoming such an important part of plant operation, our knowledge of these *new* sources must be broadened. It appears to me that our activities always have and will continue to revolve around two fundamental principles:

(1) Hold all existing business in competitive fields.

(2) Develop new ways to increase the use of kilowatthours in the thousands of industrial plants that we serve and which will require and demand improved production methods.

During the past few years a great many things have been discovered that may or may not have a bearing on our energy sales and in fact, may or may not have any effect on our way of living. However, sometimes these apparently useless discoveries become very valuable and very useful later on. Sometimes other discoveries are made but they are not put into use until long after they should or might have been. Thirty years ago we had carbon filament lamps; we had metal reflectors; and industrial gold plating. Today, we are serving thousands of kilowatts of industrial infra-red lamps for drying innumerable jobs. Infra-red uses a carbon filament and a gold or silver reflector. Thirty years ago there were heating and drying jobs to be done but we had to wait until just a few years ago before anyone had the intuition or courage to put these lamps to industrial use. In this same category we could place a number of those electric heat-treating jobs, consuming thousands of kilowatthours, that have had such a great deal to do with the metallurgical improvement of materials put to test under many and varied conditions. Electronics, electronic control, ultra high frequency heating, were born in this era and offer almost unlimited possibilities. These things and many others in their various stages of development are the things that make us grow and keep us constantly on the alert for new markets. There will be more new developments, more new applications, and it will be the Power Man's job to find ways to speed up their acceptance by our customers. During the two or three years of the war these developments have expanded tremendously and a thorough knowledge of their accomplishments will be invaluable in future planning of our industrial sales activities.

Whether we like it or not, we are all faced with the loss of war loads; we are faced with reconversion to peacetime production; one-shift operation versus two and three shifts; a potential drop in kilowatthour sales; and possibly an attitude of more strict economy on the part of our customers. It is my opinion that we will feel the impact of the losses during the change from war to peace to a much greater degree than a lot of us anticipate or care to admit.

Analysis of your industrial growth may indicate that industrial sales during the war years, that is, 1943-1944, were as much as 100 per cent higher than previous normal years and may not be equalled again for some time to come. That being true, it becomes more important that we carry on a more aggressive power sales program in order to maintain those sales levels at a point at least *approaching* those war years.

During the hustle and bustle of the war the Power Man has been acting as a consultant, so to speak, advising the industrial customer and providing him with electrical capacity to produce for war. Although the Power Man has been directly responsible for the installation of a large part of the *electric furnace equipment* in industrial plants, it is probable that there are any number of installations that were made, in spite of, rather than because of his promotional efforts. Informational data obtained on the operation of *all* this equipment should now be collected and set up in such a manner that it will be of maximum promotional value to your Power Staff later on. The information compiled on the equipment in actual operations will be invaluable in promoting similar applications in other plants. It could further be used in the educational training of others and as a sales tool to create greater interest by all of your customers. In general, the same principle applies to all other industrial applications with which the Power Man has had experience, and these too should be brought up to date.

Although the "production for war" job is pretty well behind us, we may well take stock of our knowledge of *production methods* so that there too we may better prepare ourselves for the job ahead. Do we know the "how" and the "why" of present methods? Can we make practical suggestions to enable the customer to produce greater quantities of quality products? Production Methods Engineering is an old field that has not been given the proper treatment by Power Men and is extremely important in any industrial development program. It has been stated that reconversion to peacetime production is "not in the cards until Germany is defeated and in no complete sense until after Japan is whipped." However, all of us have already heard rumors of partial reconversion and it is during this reconversion period that we can be of considerable assistance in planning the new or rearranging the old production line. This may mean devoting much more time down in the plant with the overalls on, instead of in the front office wearing a white collar and tie and discussing contracts and rates. But I can assure you it will pay handsome returns. A little later on in this program you will hear more of this relatively new and valuable power sales tool—Production Methods Engineering.

Your industrial and large commercial customer has been a much harassed individual. He has been confused no little by the maze of government forms, priorities, minimum prices, maximum prices, red tape and blue tape, to say nothing of taxes. During the past several months he has listened to postwar committees, postwar programs and plans, and maybe all of it has come to have a vague and impractical ring. Speeches and papers can only suggest ways and means for gaining an objective, which in this case is a place in the postwar market. These suggestions should be put to work, or the time devoted to the speeches and papers will have been wasted. To avoid being left at the post, it is becoming increasingly vital that the Power Man along with the industrial customer get down to the business of making actual preparation for production and selling after the war. This will require detailed analysis of the problems to be anticipated and the formulating of definite and well thought out conclusions. Be ready to act when the shooting stops.

One company anticipating the tapering off and possible cancellation of its war contracts, set up a postwar planning committee to outline all the postwar questions, and line up the ideas.

(1) A drive was started to spark the imagination of the men in the sales department and in the drafting room.

(2) The president sent a letter to all stockholders outlining the plan and ask-

ing for suggestions. Many interesting, and some useful replies were received.

(3) Special advertising was run in trade journals and other publications describing the company's facilities, and inviting manufacturers and inventors to submit ideas for development.

(4) Engineering staff began a study of the plant's wartime operations and planning adaptations of machines and production methods to postwar work.

It is hardly necessary for me to tell you men of the value of your assistance to these customers in formulating and putting the plans to work. They have not forgotten how you helped them over similar obstacles in 1941-1942. All of you older men have had broad experience in this particular phase of our business, but we do need a general sharpening up to derive the maximum benefits from this *opportunity*.

During the early days of the war we often heard the remark, "too little, too late." Fortunately for this great industry of ours we were able to, and did, provide the capacity required not "too late" but "on time." Certain groups said that electric companies under business management could not provide sufficient electric power for an all-out war effort. It has been proved that that job was done and well done and we all take great pride in that accomplishment. However, a close analysis of our own situation in the Power end of the business, may indicate that we will be "too late" if we do not take immediate advantage of every opportunity to expand and apply our knowledge of new developments and new markets. A thorough understanding of our entire market is most important. Development of such an understanding is a big job, but it is fundamental and without it we are bound to be badly handicapped in an attempt to capitalize on its opportunities. There are many ways of developing understanding and of conducting training programs designed to fit the problems of your individual companies. Briefly, I might offer a few suggestions:

(1) Analysis and criticism of present power sales methods; take stock of past accomplishments and future requirements.

(2) Hold regularly scheduled group conferences where methods and individual problems are discussed and criticized freely.

(3) Greater interest in and attendance at manufacturer's meetings and training schools.

(4) Sales training courses from a qualified source, experienced in the job of selling.

There are many others that could be added to these that might be of even more importance.

If we have made the mistake of not having properly cared for all of our customers, it is time we wake up to the value of doing so. Recently, because of the shortage of manpower in our various industrial divisions and the demands of larger industrials on the services of the Power Man, we have found ourselves neglecting the relatively small industrial as well as the larger commercial customer. The small industrials I refer to are those in the power brackets of 2500 to 3000 kwhr per month. During the war period very few, if any, of these customers were concerned about their power or their lighting costs. However, one would not be criticized too much if he predicted the day is not too far distant when this relatively large group of customers will welcome advice on other equipment that might permit them to produce their electrical needs at a lower cost. The small diesel and perhaps the gas engine may seem to offer that possibility. There is bound to be an unlimited number of cheap engines, new and used, available along with an equal number of salesmen, uninformed or unethical, attempting to sell equipment by misrepresentation. Internal combustion prime movers will be more rugged and dependable, and will cost less to buy, less to install, and less to maintain. The only sound method I can suggest to combat this competition is to meet it on common ground with a sufficient number of properly trained, energetic, and enthusiastic Power Men who have the knowledge, fortitude and courage to accept the competitive challenge. There is nothing automatic or inevitable about this business of ours. We are faced with keen and aggressive competition in an industrial market that offers much; and where courage, imagination, or hard-headed planning is lacking, a more *accurate* appraisal of your postwar market will become just a futile gesture.

We should properly train the individuals who will have to do with the development and promotion of this market. These individuals should include, not only the young inexperienced graduate engineer but the older Power Men, as well, who may have become a bit rusty. Regardless of what some people say I believe "you can teach an old dog new tricks."

We should encourage the development of well planned courses by electrical equipment manufacturers. By full attendance at these meetings the Power Man gains fundamental knowledge of the equipment that will enable him to convince his customer that he knows his job and that it would be unprofitable for him to consider other types of competitive equipment. We certainly would be making a grave mistake if we attempted to sell new applications unless we were satisfied that the equipment would perform and stand up under the conditions that prevail in the everyday operation of the customer's plant. Thorough schooling in application engineering is of great importance and by coordinating our efforts with those of the manufacturers we can avoid the effects of disconnected selling. It is also important that we find out all there is to know about our competitor's equipment, whether it be the diesel, the gas engine or turbine or whether it be oil or gas-fired heating or melting equipment.

Some of the boys who left us will be returning from the various fighting fronts with perhaps an entirely new slant on life. Some will return to us, while a few will find desirable employment in other fields. In any event, it will be necessary for all of us to find replacements and additional men to reinforce our Power Staff to meet the changing conditions. It is my opinion that the modern Power Man should have a definite engineering background. If he is not already sales-minded, he should be of the type that will absorb the best sales-training methods available. The individual should, of course, be determined, diplomatic and efficient, as well as intelligent and willing.

I am sure that the men in this room form the nucleus of a powerful organization. I would like to emphasize the fact that our problems are national and not only local. Our success and progress depend to a large degree on the prosperity of our customers. If we are alert and understanding of their problems, and are cognizant of the difficulties that lie ahead of us, we will, I am sure, accept the challenge of our competitors and enthusiastically continue forward to new markets.

And in conclusion, may I leave this one thought with you—an old football slogan that applies to business as well as to sports—"the best defense is a strong offense—outscore the other fellow and you must win."

Better Production Methods Pay Dividends

By Robert G. Ely

Public Service Electric & Gas Co.

Presented before the Annual Commercial Meeting, EEI, National Power Sales Section, Chicago, April 3, 1944

THERE isn't a power salesman who wouldn't resent an implication that during the war he's been lying down on the job; and justly so. Power salesmen have done remarkably well together with the other departments of their companies in coordinating the tremendous expansion of their industrial customers engaged in war production. Hampered by shortages of materials, priorities and contractual red tape, power salesmen deserve much credit for the delivery of enough power and for the technical assistance, as well, which enabled our industries to do the job on time.

This period, however, has been a seller's market and equipment and methods have been adapted by manufacturers with little regard for expense because of the pressure for delivery of war material.

Without detracting an iota from that which has been done, however, it is also quite apparent that many of us have had little actual selling experience during this period.

After the war electric furnaces, infrared tunnels, induction heating installations will not be sold because shipping dates are better. They will have to be sold on the quality of the work they do, the economies they create and on their collateral advantages. In short, they will have to be sold in a buyer's market.

It is rare in industrial history that it is possible for organizations of the type we represent to look forward with such certainty as to the future. What are some of the things we know about the future market for power? There are three that are outstanding:

1. We will have competition from manufacturers of steam turbines and steam engines as well as from gas and Diesel engine manufacturers.

2. War brings rapid and wide acceptance of newly developed equipment and processes which would take years to introduce during peace time. We then have newly created markets and there is no dearth of applications to sell.

3. Kilowatthours per man hour in industry declined considerably in 1942 as compared with 1940 and 1941, indicating the emergency use of production methods which would give immediate delivery of equipment rather than the production economy necessary in competitive markets. There are indications that high labor and material costs will continue postwar and if so, it will be necessary for industry to reduce manufacturing expense in order to survive. Furthermore, we all know, that during periods of declining business, industry is interested in reducing all production costs and fixed charges to a minimum.

All too often in the past, industry has looked on the high thermal efficiency of Diesel engines or the installation of turbines for by-product power generation as a source of plant economy. It is easier to make such a comparison with purchased power costs than it is to restudy, recheck, and retest production methods with which industry is long familiar.

To forestall this competition, then, it becomes necessary for us to focus our customers' attention on the jobs that power will do for them in their plants. The new power applications which have been developed during the war afford a great opportunity for production method improvement and measurable plant economy.

How then are we going to meet this challenge of competition as well as the need for sustaining the growth of our power business which will confront us post-war—which confronts us today as contract cancellation has already started some plant conversions to normal products?

The answer will be found in a better knowledge of our customer's business and manufacturing methods which can be gained through the use of a new technique of power sales.

A chapter in the Power Sales Manual, which will be available shortly, discusses this technique in detail. It consists partly of an adaptation to power sales of the Job Methods Training of the War Manpower Commission and Methods Engineering.

Production method analysis, which this technique may be called, is merely a systematic approach to the work we have been doing for years as power salesmen, with our viewpoint and interests broadened to include customers' production methods as well as particular electrical applications.

The details and theory of this technique of power sales are discussed fully in the Power Sales Manual so that we need to touch only on its three most important phases.

Business Factors

An analysis of the general business factors affecting a customer's plant is a first essential. Consideration should be given to:

1. The market for products.
2. The competitive standing of this plant with respect to its own industry.
3. The raw material supply—by-products—waste disposal.
4. Transportation and labor supply.
5. Plant location and design.

A reconaissance of this kind will promote an understanding of customers' problems and will often give the key to existing job methods.

Economics of a Job

An examination from an economic standpoint of particular processes or problems in a customer's plant should always precede a detailed analysis. It is the second step in this ordered approach to power sales. The duration of the job or life of the operation should be determined together with the labor and material expense involved. Otherwise, new methods developed after the expenditure of much time and effort in analyses may never "pay out."

An experience with a customer making small quantities of nichrome aptly illustrates the need of such an examination. I happened to be in the plant manager's office when his foreman reported the loss of a batch of metal. Questioning developed that an average of two batches per year were lost at a cost of $200 per batch because a coal-fired preheating operation could not be properly controlled. Being an enthusiast I said we could do the job electrically and offered to work out the details. We developed a special electrical heating application for off-peak operation in which the saving in material apparently more than offset the higher cost per batch for electricity. New equipment, however, was estimated to cost $10,000 and it

was not until the job was entirely worked out that I discovered to my chagrin, that the demand for the material was so infrequent and periodic that investment costs could never be recovered. A more thorough preliminary investigation would have disclosed this fact.

The Existing Method

Before we endeavor to make suggestions to our customers for process changes or new power applications we must analyze the existing method and break down the job into its various steps and operations. Such analysis requires that we maintain a questioning attitude in our discussions with our customer so that we may determine in detail every step of the method in use. Operations will be found that represent habit and those plants in which there have been few, if any, recent changes in the method of manufacture offer a fertile field for production method improvement.

After determination of all of the details of the existing method, the real need and purpose of each step in the present process must be checked. This is necessary so that we can make intelligent suggestions for the development of a new method through the elimination, the combination, the rearrangement, or the simplification of various operations or processes.

To summarize then, we must determine:

1—The general business factors affecting a particular customer.

2—The practical limits of expense for changes in specified operations or production methods.

3—The exact detail and purpose of each step in this specific operation or process.

Analyses made in this manner will uncover needs for materials handling equipment, the establishment of plating, painting or heat treating operations right in production lines rather than in centralized departments. They will uncover needs for induction or infra red heating, welding, and electronic control. They will uncover needs in one place or another for all the power applications we have to sell. But they will do more than this. These analyses will also help us to determine the real value to our customers of proposed new electrical equipment because we will be in a position to evaluate the concomitant saving in operating costs which in the past we have all been too prone to include with the collateral advantages of this equipment.

Guide Posts

In making method analyses and developing new methods there are certain guide posts which give a valuable check on existing methods and proposed plans.

Among the important guides are the quantities of material lost in process and the percentage of rejects.

We should remember that a customer's demand usually indicates the method of production, whereas the kilowatthours in excess of a base or friction load indicates the quantity of production.

The U. S. Census of Manufacturers also is a source of valuable information and figures for various industries on the per cent purchased power cost of the value of product and the kilowatthours per dollar of product can be obtained from this census.

There, gentlemen, are the highlights of the use of methods analysis in power sales and you may well ask—if I may be pardoned a modern but basic expression —So What? Why should the power salesman do this job?

One outstanding characteristic of American industry is that little is done in secret. Trade magazines and authors of technical papers have full access, with few restrictions, to all the information available on developments in manufacturing methods and processes.

Where is there a group of engineers in a better position than the utility power salesmen to absorb and disseminate this vast store of technical and practical knowledge. Organized as we are for the work which we are doing we can capitalize on this great opportunity to be of service to our customers.

Will production method analysis increase your power sales? Will it help create healthy, growing industries on whose employees we depend for residential and commercial sales? Will it help meet competition?

Case History

Last year many of you were present at the Open Meeting of the Industrial Heating and Power Committee and had the pleasure of hearing Mr. Fred Schwerer of the West Penn Power Company discuss the methods job which was done for a glass toy manufacturer in which labor and production problems were solved by the installation of an infra-red tunnel and convevor belt, stepping up production from 28,000 to 50,000 finished pieces per day.

Today I want to tell you of an experience of one of our Power Salesmen in analyzing existing methods and developing a new process for a manufacturer of kraft paper drums used in the storage of resins, asphalt, chemical compounds and pharmaceuticals.

Orders were piling up faster than production capacity of 800 55-gallon drums per 8-hour day. The main bottleneck seemed to be the drying of a waterproof coating applied to the inside of the drum to prevent materials from sticking to the drum.

Upon examination of the process in detail, and questioning the plant superintendent, the original process was found to consist of many hand labor operations involving excessive handling, transportation, temporary storages on the operating floor and concomitant delays. The ratio of kilowatt hours to dollars of product was very low.

The process consisted briefly of the following steps:

1. Fabrication of the cylinder by rolling a flat fibre board then stapling, gluing, stitching and sealing the seam.

2. Manufacture of head and bottom from fibreboard squares by cutting and forming flanged circular discs.

3. Caps for closure of the head opening consisted of two discs cut from fibreboard squares and stapled to two smaller discs obtained from the operation in making the opening in the head.

4. Assembly of the cylinder member with head and bottom pieces by gluing, stapling and stitching.

5. Spraying inside of drum with a coating solution, 80 per cent water. Storage space for air drying of drums was quite a problem.

This process required 21 employees performing 29 operations per drum and permitting production of 16,800 drums per month.

The new process as developed in close collaboration with the plant superintendent involved the following changes:

1. Infra red drying in a continuous tunnel oven of the sheets sprayed with the special solution before forming the cylinder.

2. Combined stapling, gluing, stitching and sealing in one operation on one machine with one man. The original method required three machines, one hand operation and four men.

3. The head is now formed in two operations on one machine by two men as compared with six machines and six operators on the original method.

4. A new continuous gluing machine increased production of head and bottom assemblies.

5. The paper cover will be eliminated

when steel strip is available and a pressed metal cap will replace it permitting pressed sealing of the opening to prevent loss of contents or water damage in shipment.

Let us look at a summary of the results accomplished:

	Original Method	*Improved Method*	*Change*
Drums/8-hour day	800	2,500	212% inc.
Operations	29	20	31% dec.
Power Revenue/Month	$76	$414	443% inc.
Labor Cost	..	..	71% dec.
Drum Cost (Labor and Electricity only)			67% dec.

This power salesman, utilizing method analysis and development has sold a job which turned a small customer paying roughly $900 a year for power and lighting service into a good industrial account with an annual revenue of $5,000.

That is the part of the job that interests us, but what about the customer?

In this case the customer had to increase production to meet current orders. The bottleneck of air drying had been difficult to overcome. The customer had had poor standing in his own industry as he was a small and marginal producer without a bright postwar outlook from a product price standpoint.

This customer has now reduced his labor and power cost by 67 per cent and the fixed charges in his plant are spread out over a greater volume of production. The result is a lower selling price per drum in the postwar market. This customer can look forward to meeting successfully, the competition in the market for his product.

Can we meet our competition in this plant? I will leave the answer to you.

Results of this kind seem remarkable but they are well within the ability of every power salesman. But before we can obtain them, we have a job to do.

We must reorient our thinking and approach to power sales.

We must study methods engineering and the tools used by methods engineers.

We must keep foremost in our minds our customers' needs for lower production costs.

Let me say again, that better production methods enable our industrial customers to compete in the market for their product. Better production methods will involve increased use of power in new applications and expanded volume.

Better production methods developed by power salesmen are necessary if we are to meet the challenge of competition which confronts us now.

Fluorescent Lamps as a Renewal Business

By Ward Harrison

Lamp Department, General Electric Co.

THE question sometimes arises as to just how the renewal business from a fluorescent lighting installation compares with that from an incandescent lamp installation and the writer recently had occasion to make some calculations along this line based on 1000 lumens delivered, that is, lighting an area of 100 square feet to 10 footcandles; or 10 square feet to 100 footcandles. The figures are as follows:

	Lamp Sales per 1000 hours
In Industrial Lighting:	
Typical incandescent installation	21.6¢
Typical flourescent installation	26.6¢
In Office Lighting:	
Typical incandescent installation	37.6¢
Typical flourescent installation	34.2¢ to 37.8¢

It is evident from these figures that for any given level of footcandles the annual return to the lamp manufacturer is today just about the same whether the customer chooses incandescent or fluorescent lighting. These calculations are based on a rated life for incandescent lamps of 1000 hours and for fluorescent of 2500 hours. Actually fluorescent lamps usually exceed their rated life and by percentages considerably larger than incandescent lamps do, hence, the renewal business from them is actually less.

The details of the cost calculations are as follows:

Industrial Lighting:

One of the most commonly used incandescent lamps for factory purposes is the 300 watt white bowl type *Mazda* lamp which sells for 70c list and has 1000 hours life. It generates 5650 lumens, and in a typical large installation, using RLM reflectors 57 per cent of these lumens or 3240 lumens will be delivered to the working plane.

$$\frac{.70}{3240} \times \frac{1000}{} = 21.6¢$$

A typical installation of fluorescent lighting uses two 40-watt lamps in a trough reflector. The lamp costs 95c and the rated life is 2500 hours. Each lamp produces 2100 lumens and in a large installation 68 per cent or 1430 lumens will reach the working plane.

$$\frac{2}{2} \times \frac{95}{1430} \times \frac{1000 \times 1000}{2500} = 26.6¢$$

A very common type of office lighting unit is the semi-indirect bowl with a light output of about 75 per cent. An inside frosted 300-watt *Mazda* lamp for this fixture costs about 70c and gives 5650 lumens. So as to have the same basis of comparison in each case we have assumed an office 20 x 80 ft with an 11 ft ceiling, having a 70 per cent reflection factor. The reflection factor of the walls is taken to be 30 per cent and that of the ceiling 70 per cent. This for the incandescent installation results in a coefficient of utilization of 33 per cent, hence, the lamp delivers 1860 effective lumens.

$$\frac{.70}{1860} \times \frac{1000}{} = 37.6¢$$

For the fluorescent installation to produce the same footcandles in this office we have first assumed the use of URC fixtures, each equipped with four 40-watt lamps. The utilization factor is 48 per cent and the effective lumens per lamp are 1010.

$$\frac{2}{2} \times \frac{95}{1010} \times \frac{1000 \times 1000}{2500} = 37.8¢$$

The use of a bare lamp fixture would result in a utilization factor of approximately 53 per cent and the lumens effective would be 1110.

$$\frac{2}{2} \times \frac{95}{1110} \times \frac{1000 \times 1000}{2500} = 34.2¢$$

The above calculations are quite independent of actual levels of illumination chosen whether it be 10, 15, or 20 footcandles. They simply show the relative lamp renewal expense for incandescent or fluorescent lamps.

Index of Transmission and Distribution Committee Minutes

A ten-year index of the minutes of meetings of the E.E.I. Transmission and Distribution Committee has been prepared by Mrs. Harriete D. Slocum under the direction of Mr. E. V. Sayles, Consumers Power Co., former chairman of the Committee.

This ten-year cumulative index contains entries covering all the papers, reports and discussions published in the minutes of meetings of the T and D Committee, from June 5, 1933, to May 11, 1943, inclusive.

The index is intended primarily for the use of members of the Transmission and Distribution Committee and others who regularly receive and preserve copies of the Minutes of Meetings. E.E.I. will not ordinarily be able to furnish back copies of the minutes since they are reproduced only for distribution after each meeting and no supply of extra copies is maintained.

Copies of the index may be obtained from the Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y., at 25c. per copy.

Subsidized Competition

By H. C. Webb

Puget Sound Power & Light Co.

Presented before the Annual Commercial Meeting EEI, National Power Sales Section, Chicago, April 3, 1944.

IN papers given earlier today, some types of competition were covered. These are problems with which the power salesman is most accustomed and which he has met with such great success.

There is another type of competition which is much more dangerous than the others previously mentioned, but does not come to the attention of many power salesmen as frequently as these others. The most expressive term I have heard for it is "Subsidized Competition." By this I mean the type of competition that is subsidized at the expense of the taxpayers by the various branches of government—municipal, state or federal. One dictionary defines subsidize as follows: "To furnish with a subsidy—grant regular allowance or pecuniary aid to—encourage, partially support or promote by a subsidy—now often implying bribery."

Before going into this matter, I want to tell you a little about our territory. The first American settlement on Puget Sound was established in 1845, only 99 years ago. One of our predecessor companies started supplying electricity in Seattle in 1886—41 years later. The State of Washington was admitted to the Union in 1889, three years after electricity was first made available in Seattle.

Our Company furnishes electric service in over 400 communities and adjacent rural areas in western and central Washington. Nearly 50 per cent of our customers live in rural areas, outside of incorporated cities or towns.

Seattle is the largest city in the Pacific Northwest and is located on the east shore of Puget Sound, 128 miles from the Pacific Ocean. Before the war it was one of the more important export cities of the United States. It has a substantial advantage in shipping over the great circle route to the Orient and is closer to Tokyo than any other American port.

Washington State numbers among its leading products and resources agriculture, lumbering, dairying, poultry, fishing and mining. It has a substantial manufacturing industry with pulp, paper and plywood playing a leading role. In recent years the State of Washington has provided nearly one-fifth of the lumber produced in the entire country. It has been estimated that the total hydroelectric resources in the State of Washington are between 7½ and 10 million kilowatts.

Subsidized competition has been in effect for many years. Municipal plants are the most familiar type. These plants were started under the belief that a municipal or government form of operation could perform services cheaper than a privately owned operation. The resources of the body establishing these plants were generally of such a nature that the credit risk was small, the interest rates were low and in many cases the question of depreciation was ignored. While some of these organizations paid taxes of one form or another, they were not as a rule set up on a basis which was readily comparable with private utility operation. In many of these operations, if electric rates are low, property taxes are high—and vice versa.

All of this is an old story to most of you, but developments in recent years make this type of operation more of a threat to private enterprise than at any other time.

During the depression years the federal government appropriated money running into the billions of dollars covering REA activities, the construction of dams, power houses and transmission lines. Federal grants were also made to some of the municipal organizations and through WPA other assistance was given.

The REA is receiving considerable attention at the present time and from the press releases it appears difficult to determine the real facts of who is trying to do what to whom. From a casual observation of the matter, it appears that Congress believes that REA activities are worthy of a close examination. If all of the facts are revealed it might be possible to determine just how far the REA program is being subsidized by the taxpayers.

Here is a type of competition which, regardless of its admirable objective, soundness, or weakness, must be recognized as subsidized competition.

We have in the State of Washington a kind of subsidized competition which is sufficiently different from that experienced in other parts of the country to warrant discussion. This particular subsidy is known legally as a Public Utility District—generally called a PUD.

Through an initiative which appeared on the general election ballot in November, 1930, this measure was passed with about 27.2 per cent of the registered voters voting for and 23.4 per cent against. The Act provides that county-wide or less than county-wide public utility districts may be created by a majority of the qualified voters of the area involved. These districts have, among other things, the power to construct, purchase or condemn utility properties for the generation, transmission, distribution and sale of energy.

The first elections for the establishment of these districts took place in 1932. To date in the 19 counties served by our Company 16 of these districts have been established.

The program has been to acquire, generally speaking, by counties, the systems of the privately owned utilities serving that area, but leaving the utility company with its main generating and trunk transmission system. Since 1930 condemnation proceedings have been brought against our Company by PUDs in 10 of the counties which we serve. Actions brought by six of the PUDs have proceeded to trial with jury awards of $22,700,000. The aggregate of these awards was approximately twice what the districts said the properties were worth. None of these districts has financed the purchase of the property involved. Four of these six PUDs have adopted formal resolutions abandoning the condemnation proceedings.

Their powers under the Act are virtually unlimited in that once a district is established there is no provision for its disestablishment, nor is there any control which can be exercised over its policies or activities except that of election

of commissioners. Three commissioners run the affairs of the district and have a term of office of six years with one of the commissioners coming up for re-election every two years.

They have the right under the law to levy annually a 2-mill tax on all real and personal property within the confines of the district, exclusive of amounts levied for interest and redemption for general obligation bonds; they have the right to issue an unlimited amount of revenue bonds; they have the right to issue general obligation bonds up to 1½ per cent of the assessed value of the physical property within the district; all of these by the mere passing of a resolution by the commissioners and without any direct approval of the voters required or even permitted.

Again speaking of the 16 districts in our territory, they have spent approximately one and a half million dollars of the taxpayers' money in attempting to carry forward a highly socialistic type of program to replace private enterprise with bureaucratic operation. The public power politicians apparently care nothing about the cost of their activities —the taxpayer furnishes the money.

Public utility districts, like municipalities under the Washington laws, are required to pay the State a 3 per cent occupational tax on the gross earnings from all energy sold, except that sold for resale. They do not pay any property taxes, but in lieu thereof, pay a 2 per cent excise tax to the State, likewise based on the gross earnings from sales of energy. According to my latest information, at least two of the PUDs in our territory have added the 2 per cent excise tax to the monthly bills of their customers. In effect the rates for consumers in these districts are thus increased by the amount of such tax.

Cities and towns are legally permitted to levy a gross earnings tax on public utility district operations within their incorporated limits. With respect to two such municipal tax levies which have come to my attention, the public utility district has in each instance added this tax to the consumers' bills, again passing the tax directly to the customer.

Public utility districts, like municipal operations, do not pay the 3 1/3 per cent federal energy tax—one type of federal subsidy. In general, public utility districts do not pay in excess of 5 per cent of their gross operating revenue in taxes. Compare this with the national average of 24.1 per cent of gross earnings of electric utilities for taxes during the year 1942.

The PUDs have recently created a Research and Information Service, which is supported at least in part by payments made to them by the individual PUDs. According to statements made in some of the annual budgets prepared by the PUDs, substantial appropriations are made for the purpose of "Assembling information and preparation, printing, publication and distribution of information and literature relating to public utility districts and the business of these districts, advertising and other expenses to determine the present and potential demand for electric service to be furnished by the districts and the manner in which facilities for supplying such demand should be constructed, extended and acquired." The PUDs have budgeted approximately $40,000 for this purpose in 1944 out of a total of about $192,000 to be raised by taxation.

In the past five years in our territory the PUDs have spent nearly $30,000 for the dissemination of information on the subject of power through another organization of similar character. Needless to say, in their advertising program they do not discuss the amount of the taxpayers' money which they have spent.

In 1934 a public utility district known as Mason PUD No. 1 was formed in Mason County covering about 5 per cent of the county area. This district entered the utility business by taking over a small mutual system in March, 1935, through the issuance of $33,000 in revenue bonds and $4,500 in general obligation bonds.

In 1936 the district issued another $22,000 in revenue bonds, making the total issue of bonds for this small district amount to $59,500.

Prior to the formation of this district, the proponents had publicly announced on numerous occasions that the intent of the district was to reduce electric service rates. However, in August, 1937, the commissioners stated that because of an increase in expenses in the operation of the district, it was necessary to raise the minimum charge on the residential rate from $1.00 to $2.00 per month. Small users objected to the increased minimum charge and the commissioners put the minimum back to $1.00 on February 1, 1938. In so doing, however, an increase in energy rate amounting to as much as $1.30 per month for customers using 140 kwhr or more was made effective. It was not until 1940 that a reduction was made in the energy rate and minimum charge. However, except for consumptions below 75 kwhr, the energy rate is still higher than the one in effect when the district took over the property.

In addition to the changes in rates, a tax was first levied in 1935, the year following formation, on property within the district amounting to two mills for operating expenses and an additional two mills for retirement of the general obligation bonds. These tax levies were still in effect in 1943.

Also in 1934, a second public utility district was organized in Mason County, PUD No. 3, embracing the remainder of the county area not covered by PUD No. 1. This district was inactive until 1938. In that year the district issued revenue bonds in the amount of $35,000 to begin the construction of rural lines and levied a 2-mill property tax to cover general district expenses yielding about $10,000. This tax levy has been continued to the present date.

In 1939 another issue of revenue bonds amounting to $34,000 was made and the district received in addition a WPA grant of about $22,800, both of which amounts were used for the further construction of lines. By the end of 1942 three more WPA grants had been received and the district had made further bond issues totaling $394,000. The total of all WPA grants received was over $64,000, while the total bonds issued amounted to $463,000.

To and including the year 1942, the district had made total tax levies in the amount of $52,737.09. In comparison, taxes paid by the district out of revenues during this time amounted to only about $5,600, and this was due entirely to payment of the State 3 per cent energy tax.

In March, 1941, the district used the proceeds from its largest bond issue, amounting to $385,000, to purchase the property of a small privately owned utility operating in and near the small incorporated town of Shelton, Washington. Prior to taking over the operation of this utility, the commissioners of Mason PUD No. 3 made the announcement that substantial reduction in rates could be made under PUD management. The PUD not only did not reduce the rates, but to the contrary increased both residential and commercial classifications in August, 1943. Despite efforts of their customers to have the rates reduced to the former level, the increased rates are still in effect.

Here are two good (or should I say

bad?) examples of what can happen when the public feed bag is used for subsidy with only indirect control at best. Compare this with a business managed enterprise which must directly justify its operations with satisfactory results or it can't raise the necessary capital for additional facilities.

Incidentally, the PUDs are not regulated by any government body—either city, county, state or federal.

The Washington Department of Public Service has regulatory jurisdiction over all privately owned utilities in the State, but not over PUDs.

Another power measure will be on the Washington State ballot in November, 1944. Originally designated as Initiative to the Legislature No. 12, it would authorize two or more public utility districts by resolution to combine and form "joint commissions" which would have the power, among others, to construct, purchase or condemn integrated electric systems or parts thereof anywhere in the State and to sell such properties to the federal government, public utility districts or municipalities, or to operate any remaining portion to which they retain title.

The initiative was passed by the legislature in 1943, but the State Senate, by joint resolution, voted to refer it to the people. This resolution was indefinitely postponed by the House. The initiative measure contained an emergency clause designed to prevent any attempt to refer the measure to the people. The validity of this clause was contested before the State Supreme Court to enable a referendum of this measure. In a unanimous nine-judge decision it was held subject to referendum. Petitions were circulated and over 100,000 valid signatures were obtained—more than three times the required number.

Thus Initiative No. 12 became Referendum No. 25 to go on the ballot this fall. Under this referendum there could be created a supercommission where only a few PUD commissioners, elected by only a small per cent of the voters, could acquire utility property having total assets of over $400,000,000, by permitting condemnation of utility property on a larger scale than ever before.

To say that these particular subsidized activities in the State of Washington are aided and abetted by federal assistance would be putting it mildly.

There is very little to be added to the information which you have undoubtedly read about the Grand Coulee and Bonneville hydro developments on the Columbia River. The Bonneville installation is completed, while the Grand Coulee power plant is about halfway completed from a power-producing standpoint, with a present rated capacity of slightly over 1,300,000 kw for the two plants.

The ultimate capacity of these two plants is estimated to be 2,462,400 kw with about 20 per cent of this power required for a pumping plant to lift water from the reservoir formed by Grand Coulee dam to the regulatory reservoir. This will leave about 2,000,000 kw available for other purposes when the power plants and irrigation systems are completed.

Incidentally, the first hydroelectric project on the Columbia River was built by our company—Rock Island—with an ultimate capacity of 240,000 kw—built with private capital—not with proceeds from taxes.

The question is frequently asked why electric power is such a hot issue in the State of Washington, where our company's rates are so low—being half the national average for residential service. The best answer is politics—not economics. The hullabaloo does not stem from customers' dissatisfaction with electric rates or service. It is caused by the politicians' desire to get votes. Politicians want to control electric power so they can wield greater political power.

Another side of the story is best set out by an editorial which appeared in the Montesano, Wash., *Vidette* on Jan. 27, 1944.

"If public ownership is good in the power industry to save the average family a few pennies a month, the Grange, to be consistent, should be perfectly willing to support a measure for a $175,000,000 bond issue to provide government owned farms to furnish the people of Oregon and Washington food 'at cost.' Certainly this is more important than furnishing them electricity 'at cost.'

"If we are going to have socialism, let's start at the bread basket, not at the cookstove. Why have a government-owned power project to irrigate land, which land may be owned and operated by members of the Grange for private profit? If the policy of selling electric power 'at cost' is sound, why should not the crops which are a product of the power, be sold 'at cost'?"

What can the power salesman do about these problems? The power salesman has always been a vital force in increasing load and providing additional revenue. This load has also helped to reduce unit costs of production. His achievements in the early days in supplanting prime movers with purchased electric power were outstanding. The present degree of electrification in industry could not have been attained if the power salesman in business managed utilities had not sold the flexibility of purchased power service which has enabled so many new applications of electricity to be developed and adopted in so short a period of time.

As the use of electricity in industry expanded, the problem became one of meeting competition from newer types of power-producing equipment. Here again the achievements of the power salesman speak for themselves.

The power salesman in the past has had to know all about his customer's plant and production, as well as a complete knowledge of the type of competition with which he has been faced.

To fully serve his customers he should have readily at his fingertips all of the facts that he can obtain with respect to subsidized competition. He should fully understand the ramifications of taxes—the different kinds of taxes paid by his company, as well as the so-called "payments made in lieu of taxes" by his subsidized competitor. He must familiarize himself with the general tax story as applied to all business and industry. He must understand those services which a privately owned regulated utility must furnish and which are not furnished by a politically managed subsidized utility.

He must familiarize himself with the rates of those politically managed enterprises so that he can point out the various angles influencing electric rates under varying conditions.

In other words, he should endeavor to learn all that he can about political management of utilities just as he has in the past studied his other competitors' programs and which he has so capably met by a full knowledge of his product and all of the factors involved in selling it.

The larger customers with whom the power salesman deals are the men whose "know how" has enabled us to produce the materials of war which have confounded our enemies. Power salesmen all over the country have contributed in a large way to the production records which have been established since our entry into the war.

Your work with these customers—

your knowledge of his plant, his operations—are part of what he is paying for in his bill for service. Your prompt assistance these days is doubly appreciated when compared with the red tape of the bureaucrats.

Your close contact with the larger customers will help to increase the production of materials for war and bring an earlier termination of this conflict than would otherwise be possible. Your assistance in reconversion will result in an earlier return to production of civilian goods when the war is over. Your knowledge of your customers' production methods may lead to new lines of endeavor bringing benefits to both.

Yes, the power salesman has an important part in this question of meeting subsidized competition. The men with whom he does business are fundamentally believers in private enterprise—they are taxpayers who recognize that the removal of property from the tax rolls increases the taxes to be paid by owners of remaining property.

They have a great deal to lose by this subsidized competition. As other industries are replaced by government operations, the taxes lost must be made up by remaining business. As other industries are regimented by government, those remaining are less able to resist the inroads of the bureaucrats.

Most of these customers are aware of the dangers of government in business. These dangers will become more evident when reconversion to civilian production gets under way and when disposition of war plants and war surpluses takes place.

For many years the public power politicians have stated that they would run us out of business. I have examined the records rather carefully to see if they are making any progress in that direction and I fail to find that we have lost any ground. To the contrary, we have made real gains.

During the depression, our energy sales declined from the high of the late twenties as did the balance of the industry. However, we did not experience any loss in customers of any consequence. Since 1932 we have increased our distribution system by more than 2200 miles, or 30 per cent, our total customers by more than 75,000, or 48 per cent. Our sales of energy and our system peak have more than doubled.

We estimate that over 95 per cent of the homes and farms in our territory are electrified. A survey is now under way which has as its objective a goal of 100 per cent electrification in the immediate postwar period—and this without any subsidy.

Programs are being developed by our company so that all of our customers—both present and potential—can avail themselves of all the benefits of low cost electric service—for their health, their comfort, their profit, when the necessary manpower, equipment and materials are again available.

The president of our company, Frank McLaughlin, said in the company's 1943 report to stockholders:

"Subsidized electric power can be a definite threat to the political and economic freedom of the people of the State. Governmental operations through subsidy and the setting up of an unfair yardstick on such basis to measure the performance of private enterprise constitute a snare and a delusion."

This same report also states:

"It is believed that the private enterprise system best serves because it is only through such a system that property rights can be preserved, individual rights and opportunities can be maintained and human values receive the maximum of recognition and the most appreciation. Private enterprise makes men captains of their souls, and in no other way can men be free. It is under the 'freedom of enterprise system' that the freedoms of the Bill of Rights have been nourished and have blossomed into fruit.

"Any program which has as its objective the replacing of the self-determination of Americanism with the regimentation of socialism is not in the best interests of the people."

Let government do that for which it was originally intended—govern. Let private industry continue to do those things which have done the most to make our country the greatest in the world today—an ever-increasing production of all things at ever-decreasing costs.

The best answer to subsidized competition is a continuance of the good job by the privately owned utilities, an efficient operation designed to give the customer the most for his electric dollar, all things considered, including no "gifts" from patronizing politicians.

A New Biography of Dr. Thompson

Beloved Scientist by David O. Woodbury, 358 pp, Whittlesey House, New York 1944, $3.50.

ELIHU THOMPSON had a hand in so many electrical undertakings that to separate his biography from the account of the beginnings of the modern scientific and mechanical age would be impossible. This volume does not attempt to draw a line of distinction between the Professor and his background and thereby gains its greatest value for a man of such genius and perfection portrayed by his accomplishments alone might seem dull. However, the unfolding of the great new concepts and applications of electricity in itself is a fascinating history, and Thompson's life serves to dramatize the numerous ramifications of the electrical industry.

Through following the expanding interests of Professor Thompson's remarkable mind we are introduced to one after another of the famous personalities who were his rivals or colleagues but always his admirers: Edison, Coffin, Steinmetz, Westinghouse, Brush, Mendenhall. We watch all the problems of a brand new industry present themselves and result in inventions and discoveries of amazing import which are now taken for granted. Alternating Current, Arc Lamps, Electric Welding, Induction Motors, Traction Cars, the Wattmeter, X-Ray, Wireless, Steam Automobiles—all came under the Professor's brilliant supervision. The growth of the idea of industrial research, and the gradual acceptance of a less competitive and more cooperative scientific attitude among inventors were fostered and brought to fulfillment by Thompson.

A vivid picture of the International Expositions and Scientific Congresses of the latter part of the last century and the first of the present shows the tremendous vitality of the new spurt of ingenuity and investigation. Against this accumulation of intellectual activity the Professor stood out as a leading light. To read of his accomplishments is to wonder at the greatness of a single mind which could grasp the fundamentals of any science and go on to offer new channels of development. The author has tried to include personal incidents of the Professor's life, but, perhaps because his professional capacity was practically his whole life, it is the scientific achievements which are remembered.

This book should interest those who do not know much about the electrical industry and its beginning as a wholly authentic yet engrossing history. To those who are familiar with that history it should recall many men and experiences which may now be forgotten and deserve to be revived in memory.—G. H.

Putting the Facts to Work in Accident Prevention

By W. T. Rogers

Industrial Relations Department, Ebasco Services Incorporated

FOR a number of years the Accident Prevention Committee has compiled statistics on the accident experience of the electric utility industry. These statistics have been issued annually with charts to show the trend of accidents, lost time and fatalities. At various times the Committee has made "cause and locus" studies to determine in what departments of the business the accidents were occurring and by means of analysis of causes to determine on what phases of the accident problems the Committee should concentrate its efforts.

A few years ago the Committee, goaded by the fact that the accident curves were tending to remain static, decided that it could be of greater service to the industry by making a determined attempt to get facts as to causes of accidents from the major portion of the industry and to make a complete analysis of these data. Accordingly, a subcommittee was appointed and given the task of communicating with the companies who regularly submit accident statistics to the Institute and ask for further information as to the causes and locations of accidents. The response was very gratifying and it was possible to use the replies as a basis for analyzing the accidents reported by about 90 per cent of the industry. This proportion of the industry figures is so large as to make the analysis representative. Although considerable attention was paid to lost-time accidents, the principal work was done with the figures on fatalities.

Great credit should be given to the work which Mr. D. C. Stewart, a member of the Committee, has been doing in compiling the causes of fatalities which resulted in the "Review and Classification of 121 Fatal Accidents Reported in Both 1941 and 1942 Within the Electric Light and Power Industry." The first report of Mr. Stewart's work appeared in the May, 1943, issue of the BULLETIN and the second appeared in the December, 1943, issue of the BULLETIN and has received wide circulation throughout the industry. Appreciation is expressed by members of the Committee to all those who have so generously contributed data for Mr. Stewart's analysis.

> To help the Accident Prevention Committee help you, please be sure that the name of the safety director or other person responsible for safety in your company is sent to the Institute Headquarters for inclusion on its mailing list to receive Accident Prevention material.

Realizing that the possession of statistics and facts about accidents is only a preliminary step, although a basic one, the Accident Prevention Committee has now embarked upon a program to PUT THE FACTS TO WORK. This program is designed to give widespread dissemination of the facts and to suggest preventive measures based upon the facts disclosed, and further, to publicize the Committee's findings in such a way as to secure the cooperation of everyone in the industry from top management through department heads, safety engineers, foremen and workers in an effort to eliminate principal causes of accidents in the industry. The cause of the greatest number of fatalities will be tackled first, the second most prominent cause next, and so on.

The program which the Accident Prevention Committee is undertaking in connection with this work consists thus far of the following steps:

1. The active cooperation and increased support from utility company managements to the cause of accident prevention was the subject of an appeal by the chairman of the Accident Prevention Committee to the Operating Committee of the Institute Nov. 17, 1943.
2. A letter to the Chief Executives of member companies was sent out by Mr. Kellogg, president of the Institute, asking them to initiate efforts in their respective companies to correct whatever unfavorable situation exists. A copy of Mr. Stewart's article and analysis of 1942 fatal accidents was transmitted with this letter.
3. A letter is being sent to about 300 safety directors and others interested in safety in the industry. This list is not complete, but the committee is trying to reach someone in each utility company who is actively interested in safety work.
4. It is planned that a letter will be sent by the chairman of the various technical committees of the Institute to the members of the respective committees, calling attention to the types of accidents with which they are particularly concerned and requesting that preventive measures be initiated.
5. It is planned to issue a series of letters which will be sent to safety directors, each letter to be concerned with particular types of accidents and preventive measures in order of importance, such as (a) contact accidents, (b) cut out accidents, (c) slips and falls, etc. These letters will be prepared for the purpose of assisting safety directors with their programs by various members of the Accident Prevention Committee who have had particular success in handling accidents in these categories and will consist of two parts:
   (1) Suggested wording for a letter which can be used by the safety director directly, or can be copied and sent to foremen over the signature of the operating manager, executive vice-president, general superintendent or other official.
   (2) Suggested questions around which a safety meeting, discussion or magazine article can be built.
6. From time to time articles of special value to accident prevention work will be published in the E. E. I. BULLETIN and will be distributed to the mailing list mentioned above.

In order to do the most good, it is important that this program receive the wholehearted cooperation of the industry. It is also important that the men in the various companies primarily responsible for safety activities receive the various communications of the Committee and, to that end, a list is being pre-

pared at Institute Headquarters in which it is hoped to include someone from every company in the electric light and power industry. A great deal of time and effort has been spent by the Committee at its various meetings as well as various subcommittees and individuals in preparing this program for the benefit of the industry, and it is hoped that the fullest use of material sent out by the Committee will be made by those receiving it.

The Committee welcomes any suggestions for extending its activities to increase the effectiveness of its work in assisting the industry generally to make substantial reductions in fatalities as well as lost-time injuries.

Pacific Gas & Electric Co. Capacity Dwarfs Boulder Dam, Bonneville, Grand Coulee

MUCH has been said and written about the Federal Government's power systems—Boulder Dam, Bonneville and Grand Coulee. They have been given credit for attracting and developing industries, extolled as mighty aids in war production and listed as factors that will play major roles in keeping California and the Pacific Northwest prosperous and great in post-war days.

In capacity the P. G. and E. dwarfs each of these Federal projects and almost equals all three combined. On December 31, 1943, the company's installed capacity and power available by purchase was 89.7 per cent greater than Boulder Dam and 48.7 per cent greater than Bonneville and Grand Coulee. With the early addition of a large new power plant to the P. G. and E. network and additions to the Federal systems, the company's 1944 capacity will be 90 per cent greater than Boulder Dam and will remain 48.7 per cent greater than Bonneville and Grand Coulee.

At the end of last year the P. G. and E. had 64 electric generating plants—51 hydro and 13 steam—with a total installed capacity of 2,089,566 horsepower and additional power available by purchase amounted to 320,040 horsepower, making a grand total of 2,409,606 horsepower. Its generating capacity soon will be increased 214,477 horsepower by another new hydro electric giant—Pit plant No. 5 in Shasta County. About the same time there will be still another increase of 201,072 horsepower as a result of the company's contract to buy the power from the Shasta Dam plant of the Central Valley Project. So the electric capacity available for P. G. and E. customers in 1944 will aggregate 2,825,155 horsepower.

The capacity of Boulder Dam at the end of 1943 was 1,270,107 horsepower and will be increased this year to 1,380,697 horsepower.

The capacity of Bonneville and Grand Coulee at the end of 1943 was 1,619,839 horsepower and will be increased this year to 1,764,611 horsepower.

Likewise the P. G. and E. far surpasses the Federal systems as to the number of war industries served with power. In fact, its war record has been so extensive and efficient that recently it received official commendation from both the Army and Navy. Its leadership in war emergency service is emphasized by comparison with Bonneville and Grand Coulee. Comparison with Boulder Dam is virtually impossible because power from there is distributed by several agencies and some of them commingle it with power they generate.

During 1943 Bonneville and Grand Coulee served fifteen large war industries, including six aluminum plants, which took nearly four-fifths of the system's power. In contrast, P. G. and E. served approximately 27,100 industrial plants and affiliated operations and only about half of its power went to them, the rest going to domestic, commercial and agricultural users. It not only did a superlative war job but also maintained its regular high-standard service to more than a million electric customers and even added several new features.

Compared with the 15 big war industries on the Bonneville-Grand Coulee lines, the P. G. and E. in 1943 supplied power to 40 shipyards and allied plants, 33 iron and steel plants, 4 magnesium plants, 7 cement plants, 43 oil field operations, 4 oil refineries, 26 chemical plants, 126 food processing plants, 111 miscellaneous enterprises and 26,700 small industrial plants. The company also served 80 military and other governmental establishments, while Bonneville and Grand Coulee served only 15.

Altogether the P. G. and E. delivered nearly seven billion kilowatthours in 1943, with about half of the total going to industries. Applying the formula of Dr. Forest Ray Moulton that one kilowatthour equals 10 man hours of labor, the industrial load was equivalent to 16,400,000 men working 40 hours per week for a full year.

As for attracting and developing industry—this has been a special policy of the P. G. and E. from its earliest days. By continually keeping its service facilities well ahead of immediate requirements and reducing its rates until they long have been among the very lowest in the United States, it has aided substantially in the development of agriculture, food processing, manufacturing, mining, lumbering, and other industries. Now it is making comprehensive plans to intensify such aid in the post-war period.

Agriculture offers a typical example of P. G. and E. cooperation. The company has played a leading part in giving California national leadership in rural electrification and thus has helped to make the state pre-eminent in the production of fruits, vegetables, dairy products, poultry and eggs, livestock and other foods. In 1939, as a result of its outstanding achievements in rural electrification, it won the Thomas W. Martin Award in competition with utilities in all parts of the nation.

In recognition of the P. G. and E.'s share in developing agriculture, the Wall Street Journal recently said:

"Rural electrification in Northern and Central California is probably more intensive than anywhere else in the world. Agriculture took as much power from P. G. and E. last year as all the 26,700 small industries and got it at an average cost of 1.7 cents per kilowatthour—half the national average cost excluding the P. G. and E. Out of 73,500 farms within a mile of any of the company's power lines 71,906, or 98 per cent, are served and most of them have been served for many years." *P. G. & E. Progress.*

Industry Accountants Hold Successful Meeting at Cleveland

ANOTHER successful meeting of the gas and electric industry accountants was held on April 25, 26 and 27 in Cleveland, Ohio. More than five hundred delegates representing the United States and Canada met at the Cleveland Hotel to exchange ideas on accounting problems, present and postwar. The enthusiastic attendance at all the sessions indicated the keenness of interest in the topics presented and discussed.

The entire afternoon of April 25th was devoted to the General Session program presided over by Mr. O. H. Ritenour of the Washington Gas Light Co., Washington, D. C., and Mr. F. B. Flahive, Columbia Gas and Electric Corp., New York, New York. Mr. Ritenour opened the session with a few remarks and accepted the "Key to the City," presented by Mr. W. R. Pringle, Assistant to the President of The East Ohio Gas Company, who took the place of Mr. J. French Robinson, President of that company. Mr. Robinson had been scheduled to speak but unfortunately was detained in New York. Mr. Ritenour then presented Mr. G. C. Lukeman of Prentice-Hall, Inc., Chicago, Illinois, who delivered an interesting talk on "Developments in Wage and Salary Stabilization." Mr. R. C. Simpson, Gilbert Associates, New York, New York, spoke on "Postwar Developments in Collective Bargaining."

Mr. Whiting Williams, Industrial Consultant, Cleveland, Ohio, drew upon his personal experiences for the presentation of "Personnel Relations." He believes that foremost in workers' minds is "Fear, fear. Everyone of them fears that when the war is ended he will have no job," and urged that more employers give serious thought immediately to this matter and then proceed to constructive action.

Mr. C. W. Kellogg, president of the Edison Electric Institute, then presented a brief paper on "Historical Facts on Depreciation," including the study of a "Statement of Depreciation Principles." He proposed the replacement of theory with proven fact.

Dr. H. B. Dorau of New York University offered a paper on "Trends in Public Utility Regulation," remarking that accounting is well on the way to becoming almost the single implement of the regulatory process. He stressed the fact that few accountants are aware of the ultimate import of the increasing regulation of their industry, their art and their future, and urged that they adjust their thinking to the trends, regulations and techniques being employed in order to understand the purposes.

The General Activities Group met on Wednesday morning under the joint chairmanship of Messrs. H. H. Scaff, Ebasco Services Inc., New York, and L. V. Watkins, Panhandle Eastern Pipe Line Co., Chicago, Illinois. Presentations were made of papers on "Employee Manuals," "Depreciation," "Renegotiation," and "Depreciated Original Cost Rate Base," by selected accountants within the industry, while Mr. P. E. Benjamin, of Towers, Perrin, Forster and Crosby, Inc., of Philadelphia, Pennsylvania, presented a paper on "Pension Plans in the Utility Industry" and Mr. L. P. Spacek, Arthur Anderson & Co., Chicago, Illinois, who has previously been a speaker at one of our meetings, gave a most interesting paper on "Five-Year Amortization in Rate-Making."

The General Accounting Committee held meetings on Wednesday afternoon and Thursday morning, under the chairmanship of Messrs. L. E. Reynolds, The Connecticut Light & Power Co., Hartford, Connecticut, and J. E. Jackson, The Cleveland Electric Illuminating Co., Cleveland, Ohio. Activities were confined on both days to a panel discussion, an important innovation being that the panel members were not limited to accounting personnel. Timely topics of "Wage and Salary Stabilization," "Employee Manuals," "Pension Plans," etc., were discussed, followed by reports of the sub-committees on "Reports to Regulatory Authorities" and "Protection and Preservation of Records," with Messrs. E. K. Higley of Middle West Service Co., Chicago, Ill., and S. E. Campbell, Natural Gas Pipeline Co., Chicago, Ill., chairmen respectively, and including remarks by Mr. D. E. Cohn, U. S. Bureau of the Budget, Washington, D. C., and Mr. W. T. Neel of the Philadelphia Electric Company, Philadelphia, Pa. The subjects for discussion on Thursday morning included "Personnel Problems." "Functional Accounting" and a "Present your Problem" period.

The Customer Activities Group, under the chairmanship of Messrs. J. J. Natale and H. R. Flanegan, both of Philadelphia Electric Company, Philadelphia, Pennsylvania, met on Wednesday morning and continued in the afternoon of the same day, with individual committee meetings under this group holding informal open conferences on Thursday morning. Mr. Natale opened the Wednesday morning session with a few remarks on "Review and Outlook." The keynote of a paper presented by E. L. Ramsey of the Laclede Gas Light Co., St. Louis, Mo., on "The Work of the Customer Relations Man Today," was the proper handling of personnel problems. Mr. C. S. Hazel of the Philadelphia Gas Works Company, Philadelphia, Pennsylvania, presented a paper which caused much discussion not only at the Wednesday meeting but also at subsequent sessions of the Customer Relations group, having to do with installing and servicing customers' appliances and piping beyond the meter. Mr. Hazel urged his audience to be alert to the possibilities of these types of contact —their negative and positive effects. He described service practices modifications all affecting customer relations—forecasting what services would be resumed and the necessity for expanding them after the war is over. Mr. W. G. Murfit of the Philadelphia Gas Works Co., Philadelphia, Pa., gave a report and review of "Customer Problems in Wartime and After." "Lessons from Wartime Billing Plans" was presented by Mr. A. J. Mayotte, with a discussion following under the leadership of Mr. W. A. Kelly, Consolidated Gas Electric Light and Power Co. of Baltimore, Maryland. Mr. J. E. Glines, Michigan Consolidated Gas Co., Detroit, Michigan, spoke on "Employee Training Programs—Wartime and After," followed by a discussion led by Messrs. M. D. Read, Minneapolis Gas Light Co., Minneapolis, Minnesota, and E. T. Colton, New Orleans Public Service Inc., New Orleans, Louisiana.

On Wednesday afternoon the same chairmen presided at a continuation of the Customer Activities Group meeting under a "Customer Collections Forum." Mr. Flanegan opened with remarks on "Customer Relations and Employee Relations." After a presentation of papers on "Maintaining Favorable Customer Paying Habits" by C. W. Tobey of The East Ohio Gas Co., Cleveland, Ohio; "Coding for Collection Follow-up" by H. S. Hahn, The Ohio Fuel Gas Co., Columbus, Ohio, which was discussed under the leadership of Mr. W. R. Seidel, Rochester Gas and Electric Corp., Rochester, New York, and "Bill Forms and Reforms" by Mr. R. F. McGlone, The East Ohio Gas Co., Cleveland, Ohio, a discussion followed headed by Mr. J. D. Elliott, The Detroit Edison Co., Detroit, Michigan. The meeting was then given over to a discussion of "Current and Postwar Problems" by a panel of eight persons. Among the subjects discussed were: "The Future of Present Emergency Practices"; "Current Employment Problems and Practices"; "Prospects for Uniformity in Utility Billing"; "Maintaining Employee Morale During Wartime"; "Operating Under Lengthened Work Schedules" and "Training Supervisors in Leadership."

The individual customer activities committees met again for informal round table discussion and without program on Thursday morning. Mr. Harry Jeffs of the Queensborough Gas and Electric Company, Far Rockaway, New York, and Mr. W. G. Murfit of the Philadelphia Gas Works Co. presided at the Customer Relations Committee. In addition to a further discussion of Mr. Hazel's paper, the question of postcard billing was thoroughly discussed. Means whereby it could be adopted and delinquent charges placed on the postcard were explained in full by representatives from the Pittsburgh area where the practice has been in effect for some time. Reading of meters by customers was discussed, the conclusion being reached that no more than two successive readings should be accepted before the meter is read by a company representative.

The Credit and Collections Committee, under Messrs. H. S. Hahn, The Ohio Fuel Gas Co., Columbus, Ohio, and K. E. Boyle, The Dayton Power and Light Co., Dayton, Ohio, agreed to undertake a comprehensive survey of industry policies and practices relative to credits and collections, the results of which are to be presented as factual data rather than recommendation of any particular policy or practice. This survey is intended to offer the industries useful information on current trends, methods and plans for postwar activities.

Unusually interesting discussions covering the most urgent problems during the present emergency and for the immediate postwar period were held at the meeting of the Customer Accounting Committee headed by H. J. Johnson, Michigan Consolidated Gas Co., Detroit, Michigan, and J. A. Williams, Niagara Hudson Power Corp., Syracuse, New York. A thoroughgoing factual report will be undertaken covering all phases of bi-monthly reading and billing, this report to be based on detailed analysis of results secured by companies which have adopted the bi-monthly method during the past two years. Mr. J. H. Roper of the Washington Gas Light Co., Washington, D. C., submitted a report covering proposed changes in merchandise billing and bookkeeping procedure, study of which will be continued with a view to presenting a complete report. Considerable discussion ensued regarding the meter reading methods and variation in billing practice. It was generally agreed that any billing method involving the estimation of consumption would be abolished after the present emergency.

Space does not permit the description of a number of other related subjects which were also discussed. Of particular interest, however, was an article by F. L. J. Hammerle of the Central New York Power Corporation, Syracuse, New York, on "Recharging and Reuse of Flashlight Dry Cell Batteries."

The Plant Accounting and Records Group under the Chairmanship of Messrs. A. M. Hartogensis, Ebasco Services Inc., New York, N. Y., and H. P. Taylor, Wisconsin Public Service Corp., Milwaukee, Wisconsin, met on Wednesday afternoon and again on Thursday morning, filling the meeting room to capacity at both sessions. These sessions were devoted to lively, informal, off-the-record discussion of a list of topics including: "Accounting problems related to current construction"; "Questions related to continuing unit property records"; "Amortization of acquisition adjustment accounts"; "Recent cases involving original cost"; "Acquisition adjustment accounts and plant adjustment accounts"; and "Contributions in aid of construction on extensions subject to abandonment after the war." Current Construction discussion covered the fields of labor, materials and supplies, and overhead. The discussion of construction overheads was particularly interesting with respect to the problems encountered at the present time when a substantial amount of expense is incurred for obtaining priorities while construction is at a low volume. "Continuing Property Records" embraced discussion of types of records maintained for various classes of property, handling of rearrangements and cut-overs in records and types of plant records maintained where continuing property records were not considered feasible. Several divergences in opinion between federal and state commissions were cited in connection with "Amortization of Acquisition Adjustment Accounts." It was felt some utilities had not presented the strongest possible argument in some of the recent cases involving original cost, acquisition adjustments and plant adjustments.

It was pointed out that in many cases, contributions received in connection with extension of service to war industries and government facilities will be required to absorb a part of the retirement loss which will be incurred if the extension is abandoned at the termination of the war.

The Materials and Supplies Group met on Wednesday afternoon and Thursday morning under the chairmanship of Messrs. T. W. Ayton of Indianapolis Power and Light Co., Indianapolis, Indiana, and E. S. Brock of Public Service Electric & Gas Company, Newark, New Jersey. Papers were presented on "Salvage in Public Utilities," "Stock Control," "Wartime Automotive Fleet Maintenance" and "Mechanical Stores Accounting." Other subects discussed were: "Changes in Purchasing Procedures"; "Post War Period"; "Recent Amendments to U-1 Regulations Affecting Reporting Procedures"; "Disposal of Surplus Materials and Equipment"; and "Stores Expenses." The papers and other subjects presented were well received and discussed at considerable length.

Messrs. H. D. Heiby of Columbia Engineering Corp., New York, New York, and J. V. Sealy, Philadelphia Electric Co., Philadelphia, Pennsylvania, were the presiding chairmen at the meet-

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Transmission and Distribution Committee Meeting

Frank Sanford, *Chairman*

THE Spring Meeting of the Transmission and Distribution Committee was held in Chicago, May 1 and 2, at the Edgewater Beach Hotel. About 125 members and guests were present and the meeting was generally regarded as the most successful ever held.

The entire morning of the first day was devoted to discussion of Standards and Specifications. Mr. T. J. Brosnan, sponsor of this committee activity, indicated that a number of additional standards are expected to be completed this year and should be ready for use before full production is resumed. Considerable progess has already been made by subcommittees working on standards for transformers, street lighting equipment, and distribution fuses and cutouts. Subcommittees are also being organized to formulate standards for a number of line hardware items.

A Progress Report on the work of the joint committee on Standards for Distribution Transformers was presented by Mr. A. E. Silver. Various essential questions of design are being worked out on a basis of industry-wide advice on the part of both manufacturers and users to determine needs and preferences. Major attention is being given at present to 3-phase pole types in small sizes.

Mr. L. R. Gaty reported on the results of a survey that canvassed a crosssection of the committee on a question of grounding secondary circuits operating at more than 150 volts to ground. These results indicated a preference that such grounding should remain optional and the committee unanimously concurred in this view.

A joint session with the Electrical Equipment Committee was addressed by Mr. Edwin Vennard, Chairman of the Special Committee on Terminology, who urged that a more easily understood designation of measurement be adopted in place of "kilowatt-hour." He suggested the term "electric unit" and told how the results of sampling surveys made by the committee supported this idea.

Mr. H. P. Seelye, Acting Chairman of the EEI Group of the Joint Committee with NEMA, presented a Progress Report on "Preferred Voltage Ratings" during the joint session. A suggested Table of Nominal System Voltages previously submitted is being revised in some desirable details. It is expected that an educational report giving complete background on the entire subject will be available for publication soon.

Mr. L. R. Gaty presented a further report on "Post-War System Planning in Philadelphia." He told how provision was being made in his company for an orderly and economic expansion of the system to meet the loads of tomorrow. He pointed out that under certain conditions it might be advisable in some cases to be prepared with two plans, one to provide for immediate relief and another as a permanent guide for system development. All, however, should be sufficiently flexible and advanced so that they can be completed quickly to meet changing load requirements.

Mr. G. H. Fiedler presented an especially interesting paper on "Economic Study for Future Distribution Growth," based on an extensive and well developed analysis of relative distribution cost components for a theoretical system.

"The Residential Customer of 1960" was the subject of a paper by Mr. J. S. Maloy who considered possible new load sources and predicted that although present-day distribution designs would probably be adequate for today's needs they should not necessarily be expected to serve such highly fluctuating loads as air-conditioning equipment having motors with a high in-rush current. He expressed the view that if such equipment is to be sold in volume it will be necessary for the utilities and manufacturers to cooperate in solving this problem in the most economical way possible.

Mr. C. W. Minard reported on the "Status of Post-War Plans of the Nebraska Power Company." He told how by organizing a committee consisting of the heads of Engineering, Operating and Sales Departments and soliciting suggestions from Supervisors, it was possible to develop a list of needed improvements arranged in order of importance with approximate costs. Total estimated expenditures for these projects, all of which would provide considerable work for employees returning from the Armed Services, amounted to about 10 per cent of present system investment.

"Planning for the Future" was discussed by Mr. F. W. Nimmer who suggested that such planning need not necessarily mean something special or unusual, but could follow much the same lines as when providing for any other anticipated load increases. He cautioned however, against extending such plans beyond a reasonable future period as changes in system design may become desirable as a result of improvements that may be made in equipment.

Mr. H. E. Stites discussed "System Expansion for Future Loads" from the point of view of a company primarily serving rural areas. In these cases he said it was more a matter of providing for a constant increase in demand created by residential, commercial and small business customers rather than dealing with changes in large blocks of industrial load. Additional production, transmission and distribution facilities do have to be anticipated and be provided for, however. Such plans may also include some conversion and modernization projects.

An interesting and informative paper on "Wood Pole Transmission Design and Operation" was presented by Mr. W. H. Knutz. Slides were used to illustrate various types of construction and line design including protection against lightning. Typical instances of damage caused by lightning and fires were also shown and Mr. Knutz described effective corrective measures taken.

A paper on "Branch Line Fusing on 4150 V Feeders" was presented by Mr. V. G. Rettig who referred to the wide differences in practice ranging from 1 to 8 fuses used in series on systems below 5 KV, with 3 in series the most common practice. Mr. Rettig described a method for determining branch fuse locations that would provide maximum possible benefits, including Reliability of Service, Protection of Lines and Equipment, Reduction of Hazards, and Flexibility in Operation.

Prepared discussions on Mr. Rettig's paper were presented by Mr. R. F. Quinn of G. E. Company, (represented by Mr. O. B. Falls); also by Mr. W. F. Nimmer, R. H. Earle and by Mr. G. H Fiedler.

Mr. W. R. Bullard reported on the results of a survey made to gather information on "Fusing Practices in the Banking of Distribution Transformers."

Mr. E. W. Davis, Chief Electrical Engineer, Simplex Wire & Cable Company, presented a report on "Buna S Insulation." This paper included laboratory test data indicating that accept-

able counterparts for natural rubber compounds are possible. Much research work, however, remains to be done in the case of these products.

A special motion picture record showing cable movement in manholes due to expansion and contraction under load, was exhibited in conjunction with a talk by Mr. T. H. Haines. These pictures were taken at the rate of one frame every 7½ minutes and when run through a projector at normal speed the motion that causes chafed or cracked lead sheaths was clearly noticeable.

"Sheath Cracks on Gas-Filled Cables" was discussed by Mr. G. H. Fiedler. Mr. Fiedler related some of his company's experiences with this type of cable and described detection and repair methods that have been successfully used.

Note: A special conference session arranged by the EEI-NEMA Joint Committee on Standards for Distribution Transformers was held during the evening of May 1 to discuss some problems of 3-phase transformer standardization. Mr. Sanford opened the conference and led that part of the discussion relating to transformer dimensions and weights. He was followed by Mr. A. E. Silver who related other immediate problems and led the discussion which followed. About 55 persons attended.

Accident Prevention Committee Meeting

D. C. Stewart, *Vice-Chairman*

THE Spring Meeting of the Accident Prevention Committee was held on May 4th and 5th in Chicago at the Edgewater Beach Hotel. About 30 members and guests were present and all sessions were well attended. Vice-Chairman Stewart presided in the absence of the Committee Chairman, Mr. H. O. Sprinkle.

Several interesting and important reports were presented and discussion on these and the various other matters considered reflected the increasing importance of accident prevention efforts in the industry.

Mr. E. J. Kreh reviewed the 1943 accident experience of the industry as reported by some 213 companies and compared this with the record of previous years. Preliminary tabulations show a decrease in the accident frequency rate from 12.1 in 1942 to 11.2 for 1943, while the severity rate increased slightly from 1.9 in 1942 to 2.0 for 1943. Mr. Kreh also indicated that an improved and more comprehensive Annual Summary Report on Accident Statistics would be prepared this year. This report will include simple and significant tables and trend charts and also brief commentary. These reports are widely distributed and are used as an aid in accident prevention work throughout the industry.

Another medium by which it is hoped the industry may be helped in this effort is a program designed to make available a series of suggested outlines for safety talks and group discussion based on subjects selected because of their importance as revealed by the committee's study and analysis of the industry's accident experience. This program is under the sponsorship of Mr. W. T. Rogers.

A report on Linemen's Cutouts was presented by Mr. H. H. Berman. This study is based on an extensive survey and analysis of such accidents. The report includes recommended preventive measures such as better education through conference discussions, greater emphasis on inspection and maintenance of lines and safety equipment, also accurate and prompt determination of how these accidents occur and what may be done to prevent them. The report when issued will also contain suggestions on how the material in it may be used effectively in accident prevention work in individual companies.

Mr. W. R. Smith told of plans being worked out in cooperation with the National Safety Council for developing posters on subjects particularly applicable to the Light and Power Industry. It is expected that some of these posters may be available in the Fall.

A very interesting and informative paper on safety practices to be observed when installing and operating shunt and series capacitors was presented by Mr. A. J. Nicholson of the Kansas City Power & Light Co. A motion picture was shown in conjunction with this talk to illustrate various typical installations and methods used by this company to prevent accidents.

Mr. T. R. Claffy reviewed the rubber goods situation and its affect on linemen's rubber protective devices. He regarded conditions somewhat brighter and felt that unless unfavorable events occur which are now unforeseen, the safety of linemen will not be jeopardized by lack of rubber protective equipment.

A second draft copy of a manual on "The Application and Care of Rubber Protective Equipment" has been completed by Mr. E. C. Rue. Copies of this draft were recently sent to the committee members for comment and it is expected that it will be possible to publish the manual within the next month or two.

A Progress Report was submitted on "Proposed Safe Practices for Electric Metermen," by Mr. H. J. Burton. This report deals with the safety aspects of such work and will be offered to the Meter and Service Group to assist in the preparation of the manual that is being prepared on this subject by that committee.

Mr. W. R. Smith presented the first of a series of Information Exchange Bulletins designed to bring to the attention of committee members brief reports on unusual accidents caused by hazards which might otherwise be easily overlooked because of their special and unusual nature. This service is confined to committee members for the present. Company names are omitted from all reports used, and if further details are desired inquiries are to be addressed to Mr. Smith, who is sponsoring this committee activity for the time being. Committee members were invited to send him brief reports on all such items considered to be of sufficient interest for this purpose.

Mr. A. Soutar, President of R. H. Burke Company, Chicago, was invited to address the committee on the development and use of various types of fabric safety belts now needed to take the place of leather, the use of which is severely restricted for more essential purposes under present War Production Board regulations. Mr. Soutar described a cord type belt impregnated and vulcanized with either reclaimed or synthetic rubber and a cotton type that is impregnated with a wax base treatment, both of which are being used apparently quite satisfactorily. Mr. Soutar indicated that such belts are being made to withstand from 2900 to 5000 pounds. He stated that a popular type tested to 3700 pounds was being supplied to the trade. While cord and cotton types are less pliable than leather, he indicated that they are readily available and can be

used as satisfactory and safe substitutes for leather.

While the committee considered the variety of problems met in accident prevention work and discussed ideas for future programs, it appeared to be generally believed that further progress in accident prevention was now mostly a matter of supervision. This means seeing that employees are more effectively instructed and trained and that all safety rules are observed. Trails of responsibility when followed verify this. Hence the growing feeling that "Management Must Lend a Hand in Accident Prevention."

Electrical Equipment Committee Meeting

R. T. Henry, *Chairman*

THE spring meeting of the Electrical Equipment Committee was held at the Edgewater Beach Hotel, Chicago, on May 1 and 2. The attendance was the largest of any session for the past five years.

The joint session with the Transmission and Distribution Committee Monday afternoon, was addressed by Mr. Edwin Vennard, Chairman of the Special Committee on Terminology, who discussed the proposal that in commercial usage the term "electric unit" be adopted to take the place of "kilowatt-hour." He explained the need for the new terminology, and the procedure followed by the Committee in arriving at the term suggested.

A report of progress on preferred voltage ratings was presented by Mr. H. P. Seelye, Acting Chairman of the EEI Group of the Joint Committee with NEMA. The table of nominal system voltages, which had been presented for discussion at the previous meeting in Cincinnati, was being revised to take account of the comments made at that time. There had also been practically completed a general discussion of the whole subject of preferred voltage ratings which it was thought would provide helpful background information. Mr. Seelye reviewed some of the major points covered, and stated that the whole story would be available for publication in the near future.

Mr. F. S. Brown abstracted the apparatus trouble report for the period August, 1943, to February, 1944. This report covered 132 cases of apparatus trouble, of which 31 were classed as major. For this period the average number of failures reported was 22 per month as against a 5-year average of about 20. None of the failures was directly attributed to overload. Lightning or lightning arresters accounted for about 6 per cent of the total number of failures as contrasted with 20 per cent for the similar period in 1943. Of the troubles classified as major, those occurring most frequently were circuit breakers—6 (4 oil circuit breakers and 2 air blast breakers), exciters—3, regulators—3. Of the minor troubles, the more frequent were regulators—12, instrument transformers—9, transformers (over 500 kva)—8, oil circuit breakers—8, turbo generators—8. Following the presentation of this report the remainder of the morning session was devoted to informal round table discussion.

A summary of replies to a questionnaire on uniform requirements for metal-clad switchgear was presented by Mr. Shew, who called attention to the trend of opinion on the various points covered.

Mr. Wilbraham reviewed developments regarding power circuit breakers. No matters requiring action having come to its attention, the EEI-AEIC-NEMA Joint Committee on Power Circuit Breakers has not held any meetings during the past year. In the ASA C37 Committee on Power Circuit breakers further work has been done on the proposed standards. Agreement has been reached on all points except one, relating to control voltage range. At a meeting last month of the ASA Subcommittee, a tentative solution of this point was reached, subject to some further review.

On behalf of Mr. Howery, Mr. Silver presented a progress report of the Meter and Service Committee. Further progress has been made on a number of subjects, including phase shifting devices, thermal demand meter ratings and scales, bar type current transformers, safety practices for metermen, and studies of new developments. Mr. Howery is completing his second year and will retire as Chairman. Mr. Silver commented that during a period when problems normally dealt with by the Meter and Service Committee had been largely at a standstill, Mr. Howery had done an excellent job keeping the organization intact and alert in meeting emergency needs.

A very successful symposium on principles of system relaying included papers by Messrs. G. B. Dodds of Duquesne Light Company, T. R. Halman of the Detroit Edison Company, and H. P. Paxson of the Philadelphia Electric Company, which were followed by a period of active discussion. This session had been arranged with particular reference to the general philosophy of relay applications in the metropolitan type of system. It is planned that a future session will be arranged to cover the transmission type of system.

Mr. DeBeech brought up to date his previous presentations on air raid protection, with particular reference to the situation in Great Britain. Recent developments in plant protection were briefly reviewed by Messrs. Hughes and Fitz. Other war time problems in the field of personnel matters were discussed by Mr. Van Veen.

Mr. Oldacre, Chairman of the AIEE group of the AIEE-ASME Joint Committee on Turbo Generators discussed further progress in the work of his group. He referred to the three types of generator rating described at the Cincinnati meeting as Generators A, B and C. Considering all the factors, his group recommended Generator B as meeting very nearly the requirements suggested. As an example, this machine, with a rating of 40,000 kw, and .85 power factor, has a kva rating of 47,000, thus giving additional reactive that seemed to be required over Generator A. He pointed out that with regard to short circuit radio the real question is one of pull-out torque, and stated that calculations indicate the proposed Generator B with .8 short circuit radio will have almost identically the same numerical value as Generator A with .9 short circuit radio. Mr. Oldacre reviewed a number of other points in question, and stated that a preliminary report of recommendations for standardization was to be submitted at the AIEE meeting in St. Louis in June.

Advances in engineering and design during recent years were described in well illustrated presentations by Messrs. D. M. Jones of the General Electric Company, S. H. Mortenson of the Allis-Chalmers Manufacturing Company, and C. F. Wagner of the Westinghouse Electric and Manufacturing Company.

Regional EEI Home Service Conference Held at New York

A REGIONAL Home Service Conference under the sponsorship of the Home Service Committee of EEI was held at Belmont-Plaza Hotel in New York City on May 10. This was the third conference in the series planned by Miss Fern Snider, Chairman of the Committee. There were 162 registrants for the morning and afternoon sessions. Previous sectional meetings were held at Atlanta and at Chicago.

Edwin Vennard, vice-president of Middle West Service Company, Chicago, and Chairman of the General Commercial Committee of the Institute, started the Conference with a forceful address on the maintenance of private enterprise and the part that women of the utility industry can take in carrying the message to the public.

Other speakers on the program were Miss Frances Armin, Director of Consumer Education of the National Adequate Wiring Bureau; Mrs. Mariquita Dygert, Home Service Director, Detroit Edison Company; E. W. Commery, Manager, Residential Lighting Division, General Electric Company; Miss Myrtle Fahsbender, Director of Residence Lighting, Westinghouse Electric and Manufacturing Company; Miss Edwina Nolan, Director of Bendix Home Service Institute, Bendix Home Appliances Inc.; Miss Clara Zillessen, Advertising Manager, Philadelphia Electric Company; Miss Esther Lee Bride, Home Service Director, Union Electric Company of Missouri; D. C. McCoy, Frigidaire Corporation; and Frank E. Watts, *Farm Journal* magazine.

The Conference attracted leaders in the field of Home Economics and Consumer Education. Emphasis was placed on the opportunities afforded the Home Service Departments of utility companies to coordinate and cooperate with the programs of the War Food Administration.

Northwest Association Forms Committee for Post-War Planning

POST-WAR planning in the Northwest Electric Light & Power Association will be activated through the newly formed Electrical Development committee, according to J. A. Hale, vice-president, Utah Power & Light Co., president of the association. In announcing the appointment of C. Patrick Johnson, vice-president, Puget Sound Power & Light Co., as chairman of this committee, Mr. Hale points out that post-war problems in an all-round planning program are difficult to differentiate from problems arising now that may be carried over into the post-war period, hence the committee should concern itself with planning "from here on out."

This committee can encourage company planning, can undertake survey and research projects to aid member companies in their planning, and can encourage united action or policy in matters where a measure of uniformity seems desirable.

Mr. Johnson, in announcing the appointment of the committee, pointed out that all companies are undertaking planning programs along functional lines; therefore it has been deemed desirable to set up the association planning along lines of organization, with the chairman of each Section and the chairman of each Section's planning committee, and other representatives as committee members. The committee will be kept small, said Mr. Johnson, for effective work. Its chief function will be to direct and coordinate what planning is undertaken, and to farm out most of the work to subcommittees in each section.

The following have been appointed members of the committee with the idea that other representation may be added as the need arises: Harry M. Jones, Idaho Power Co., chairman of the Engineering & Operation Section; O. L. LeFever, Northwestern Electric Co., chairman of the Engineering Section's planning committee; Charles E. Hess, Puget Sound Power & Light Co., chairman of the Utilization Section; D. B. Leonard, Pacific Power & Light Co., chairman of the Utilization Section's planning committee; T. W. Fryou, Portland General Electric Co., chairman of the Accounting & Business Practice Section; E. W. Bredemeier, Portland General Electric Co., chairman of the Accounting Section's planning committees; Ross B. McElroy, The Washington Water Power Co., chairman of the Membership Committee of the Utilization Section; C. W. Sherman, Puget Sound Power & Light Co., chairman of the newly formed Personnel Conference of the association; L. R. Wilson, Lamp Dept. G. E. Co., representing the manufacturers; and Harry A. Dunlap, Westinghouse Electric Supply Co., representing the distributors.

The ground work for specific planning projects was laid by a meeting of the committee in Portland, March 22. The committee proposes also to exchange information and data with other industry groups engaged in similar work: Edison Electric Institute, Pacific Coast Electrical Association, Rocky Mountain Electrical League and others.

Luke C. Bradley

LUKE C. BRADLEY, vice-president of the Stone & Webster Service Corp., New York, died at his home in Lafayette, Ind., on May 12 of heart disease. He was 69 years of age. He had relinquished active duties in 1940 because of ill health.

Mr. Bradley had varied experience as directing head of utility companies in different parts of the country. His association with Stone & Webster began in 1901 in connection with the operation of utilities in Seattle and Tacoma, Wash. Three years later he became identified with J. G. White & Co. to manage its Pottsville (Pa.) utility properties.

Returning to Stone and Webster seven years later, he assumed charge of numerous public utilities in that system in the South and West. In 1925 he was made president of the Virginia Electric & Power Co. in Richmond, remaining in that capacity for two years, when he resigned to become president of the Rhode Island Public Service Co. at Providence. In 1928 Mr. Bradley assumed an executive position with the Electric Bond & Share Co., New York. Three years later he went to Chicago to become president of the Consolidated Electric & Gas Co. and remained in that position until a few years ago when he returned to New York and again joined Stone & Webster.

Harry W. Hough

HARRY W. HOUGH, vice-president in charge of operations of the Cleveland Electric Illuminating Co., Cleveland, Ohio, died in that city on May 8 after a brief illness.

Mr. Hough was a self-made electrical engineer who rose to become vice-president in charge of operations of one of America's largest electric light and power service companies. He achieved an international reputation as an engineer and utility executive. For many years his counsel was sought in connection with technical and operating problems by leaders in the electric light and power business in America and foreign countries.

Mr. Hough was born in Baltimore, Maryland, January 20, 1885. After attending Baltimore public schools he obtained his first job with an electric interurban railway operating between Norfolk and Virginia Beach, Virginia.

Always a serious student, Mr. Hough utilized most of his spare time to read technical publications and textbooks on electrical subjects. In addition, he took a correspondence course in electrical engineering. In 1910, feeling himself qualified, he wrote a letter applying to The Cleveland Electric Illuminating Company for an electrical operating job, and got it.

In 1914 he was made assistant to the chief electrical engineer, and held this position until he went into military service as a captain in the U. S. Army Engineers Corps in World War I. As captain in the Engineers Corps, he was assigned to important duties in Washington, which involved procurement of electrical equipment and supplies to rehabilitate electric systems in France damaged by enemy action, and to expand such facilities to meet requirements of the American Expeditionary Force.

When Mr. Hough returned to the Illuminating Company in 1919, he was appointed research engineer, and was assigned to special studies by the president of the company. During this period, he participated in the early development of wired radio, which today has many applications in the fields of communication and entertainment. In 1923 he was made assistant to the president, and in 1934 became vice-president in charge of operations.

Duquesne Light Co. Wins National Security Award

Jobie O. Edeburn, Foreman, Substations and Shops Department, Duquesne Light Company, receives the National Security Award from Col. Henry A. Reninger, Acting Director, Third Civilian Defense Region. Pressly H. McCance, President of Duquesne Light Company, looking on. Mr. Edeburn is the oldest active employe of the Duquesne Light Company, having entered the service of the Company in 1898.

IN RECOGNITION of its maintenance of a superior standard in protection and security, and effective efforts to safeguard production, employes and property, the Duquesne Light Company of Pittsburgh and its employes on May 16 received the National Security Award in a presentation by Colonel Henry A. Reninger, United States Army and Acting Director, Third Civilian Defense Region.

The Duquesne Light Company was given the award because of its organization for the protection of personnel, training and enrollment of its employes in Civilian Defense Corps and local defense councils, and superior protection of its four major electric power stations, its hundreds of miles of transmission and distribution power lines, and its many substations located in Allegheny and Beaver Counties, which serve over a third of a million customers.

Pressly H. McCance, President of the Company, received the award at a luncheon meeting attended by officials and employes of the company, military, federal, state, and municipal officers, and others. Other speakers were Dr. Ralph Cooper Hutchinson, Executive Director, Pennsylvania State Council of Defense; Col. Lucius McKay Crumrine; Lt. Col. Robert C. Downey; and Walter G. Jens, Vice-president, Duquesne Light Company. Edmund C. Stone, Vice-president and General Manager, Duquesne Light Company, presided.

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420 Lexington Avenue, New York

PERSONALS

Detroit Edison directors have accepted with regret the resignation of ALFRED C. MARSHALL as president and elected PRENTISS M. BROWN a director and chairman of the board and JAMES W. PARKER as president of the company. At the company's request, Mr. Marshall, who has served for some time beyond the retirement age fixed by the company's retirement plan, will continue as a director and as an active consultant in the company's affairs.

Mr. Brown, the new board chairman, is former head of the Office of Price Administration and former United States Senator from Michigan. Mr. Parker, newly elected president, has been with Detroit Edison since 1910. He is at present a director and general manager, positions he will continue to fill in addition to the presidency.

Mr. Brown stated that he will take up his new duties immediately at Detroit. "I am extremely happy," he said, "to join with Mr. Parker in heading a company with the reputation and record for public service which Detroit Edison has. We see no reason for change in operating policy. . . . "

ROB ROY MACLEOD, executive vice-president of The Niagara Falls Power Company, has been elected executive vice-president of the Buffalo Niagara & Eastern Power Corporation. Mr. Macleod will move his offices to Buffalo to assume the newly created position under Col. William Kelly, Corporation President.

Mr. Macleod has been connected with public utility work since 1926 when he joined Buffalo Niagara & Eastern Power Corporation as editor of its employee magazine. Two years later he became public relations manager. In 1933 he was made vice-president and general manager of the Bradford Electric Company while that company was associated with the Niagara Hudson System. He later became president of the same company.

When the Bradford properties were sold, Mr. Macleod returned to Niagara Falls as executive vice-president of The Niagara Falls Power Company. In the same year (1936), he was elected president and director of the Niagara Junction Railway Company.

Other staff changes in subsidiary companies of the Buffalo Niagara & Eastern system that will become effective with action by the Boards of the various subsidiary companies, are as follows:

WILFRED C. STEPHENS, vice-president of Niagara, Lockport & Ontario Power Company, will move from Buffalo to Niagara Falls to become vice-president of The Niagara Falls Power Company. At that time he will relinquish his present offices in the Niagara-Lockport & Ontario Power Company and The Lockport & Newfane Power & Water Supply Company but will also be made a vice-president of the Buffalo Niagara Electric Corporation which serves the City of Niagara Falls.

Succeeding Mr. Stephens will be ROY S. ALLISON, present manager of the Cattaraugus District of Niagara, Lockport & Ontario Power Company. As vice-president of Niagara, Lockport & Ontario Power Company and The Lockport & Newfane Power & Water Supply Company, Mr. Allison will be in charge of the various districts of these companies.

In Niagara Falls, LESLIE E. ROSS, now a vice-president of The Niagara Falls Power Company, will, in addition, become president of the Niagara Junction Railway Company succeeding Mr. Macleod who will resign the presidency of the Railway Company upon coming to Buffalo.

GEORGE R. CONOVER has been elected vice-president in charge of personnel and public relations of the Philadelphia Electric Company.

Mr. Conover, a registered electrical engineer, spent 10 years with the Public Service Electric and Gas Company of New Jersey before going to Philadelphia in 1929 to become managing director of The Electrical Association of Philadelphia. The membership and activities of the Association rapidly increased under his leadership until it embraced a cross-section of the entire electrical industry in Bucks, Chester, Delaware, Montgomery, and Philadelphia counties. He inaugurated and successfully managed for the Association a number of electrical expositions for the purpose of presenting to the public the newest thoughts and applications of electricity to industry and the home.

He remained with The Electrical Association until April 1, 1939, when he was made Manager of Public Relations of the Philadelphia Electric Company. On March 1, 1942, when the Electric Company's Public Relations and Personnel Departments were combined, he was appointed manager of the new department. He held that position at the time of his latest appointment.

At the recent annual meeting of the stockholders of the New Jersey Power & Light Company, H. C. Thuerk, president of the company, outlined the changes in the supervisory personnel which were brought about in connection with the establishment of the executive management of the company at Dover last November.

R. R. PARKER, formerly assistant treasurer of NY PA NJ Utilities Company, the parent company of New Jersey Power & Light Company, has been elected a vice-president, treasurer and director. R. N. MALEHORN was elected secretary.

The new position of chief engineer has been filled by J. P. MAILLER, formerly chief engineer of the Northwestern Water & Electric Service Corporation. Mr. Mailler will be in charge of the Operating, Construction, Engineering and Transportation Departments.

P. P. KINNAMAN, formerly division operating superintendent, has been promoted to electrical engineer, and has appointed S. A. MITTERLING as distribution engineer.

WILLIAM E. LIEPE, formely engineer and sales manager for the Bradford Electric Company, Bradford, Pa., has been appointed rate and research engineer. CARL W. PARKER, storekeeper of the company in Dover for a number of years, has been promoted to the position of stores supervisor.

Following the resignation of F. S. Hoefer, formerly general sales manager of the company, W. C. PARRY was placed in charge of all power sales and industrial development activities. W. F. MOSES, formerly division manager of the New York State Electric & Gas Corporation at Cortland, New York, has become domestic sales and advertising manager.

H. B. ALLEN, vice-president and general manager, and H. C. THUERK and R. R. PARKER were re-elected directors of the company for the ensuing year.

BASIL J. WILKINSON, administrative assistant to the district manager, has been made district manager of the Cattaraugus Division of Niagara, Lockport & Ontario Power Company. Mr. Wilkin-

son succeeds Mr. Allison who was recently elevated to the position of vice-president of the company in charge of all operating districts.

Ralph D. Jennison, president of New York State Electric & Gas Corporation, has announced the appointment, effective June 1, 1944, of WILLIAM A. LYONS as assistant to the president of that corporation with offices in Binghamton, N. Y.

For the past 15 years Mr. Lyons has been connected with the Associated Gas and Electric System in various financial, accounting and management capacities. Since Oct. 1, 1941, he has been comptroller of NY PA NJ Utilities Company, the parent company of New York State Electric & Gas Corporation, from which position he is resigning. Mr. Lyons has been on loan by NY PA NJ Utilities Company to the War Production Board as chief of the Fuel and Allocations Branch, Office of War Utilities, since September, 1942. He resigned his position with the War Production Board on April 30, 1944.

Prior to coming with the Associated System in 1929, Mr. Lyons was employed in the accounting department of Consolidated Edison Company of New York for five years.

As assistant to the president of New York State Electric & Gas Corporation, he will have executive responsibilities in the office of the president in the fields of financial, accounting, tax and certain management matters. Otto C. Vieweg, who for some time has been assistant to the president on general operating matters and other problems of a management nature, will continue in that capacity.

STANLEY B. SHERMAN, vice-president and general manager of the Wisconsin Gas & Electric Co., has been elected president of the Wisconsin Utilities Association for the fiscal year beginning May 1. Other officers elected included: vice-president, M. H. MONTROSS, vice-president, Wausau division, Wisconsin Public Service Corp., Wausau; treasurer, ALFRED GRUHL, assistant research engineer, Wisconsin Electric Power Co., Milwaukee.

Mr. Sherman has been chief operating officer of the Wisconsin Gas & Electric Co. since 1940. A graduate of the Armour Institute of Technology, Mr. Sherman has been connected with Wisconsin Gas & Electric for the past 25 years. In 1937 he was named chief engineer and in this capacity had charge of both the electrical and gas engineering departments. The following year he was promoted to the position of general manager and in 1940 was made vice-president and general manager and elected to the board of directors. For the past year he has been vice-president of the Wisconsin Utilities Association.

JAMES P. MCKEARIN, chief engineer of the Western Massachusetts Electric Co., Springfield, has retired from that position and has been succeeded by JOHN W. BENNETT. Mr. McKearin left the Boston office of General Electric in 1917, where he was assistant district engineer, to become electrical engineer of the United Electric Light Co., Springfield, being made electrical engineer for the constituent companies in the Western Massachusetts group in 1927, and chief engineer in 1936.

JOHN W. BENNETT, who has become chief engineer of the Western Massachusetts Electric Co., was educated at the University of Minnesota. He was engaged in utility engineering work in New Jersey previous to joining the Western Massachusetts organization in 1930 as distribution engineer, later becoming assistant chief engineer, with headquarters at Springfield. He is a past-chairman of the Springfield section of A.I.E.E. and past president Engineering Society of Western Massachusetts.

C. O. BUNNELL, formerly rural service supervisor of the Pacific Power & Light Co., is now manager of the Hood River-Klickitat district. As rural service supervisor of the company for the past several years, Mr. Bunnell made his home in Yakima. Among other positions he has held with the company, Mr. Bunnell served as local manager at White Bluffs. He has been with the Pacific Power organization continuously for the past 28 years.

ROY B. TULPIN, secretary and auditor of the Central Illinois Public Service Co., Springfield, Ill., has been elected a vice-president of the company. Mr. Tulpin will continue to perform his duties as secretary and auditor.

JAMES H. HARLOW has been appointed assistant mechanical engineer, mechanical engineering division, Philadelphia Electric Co., succeeding the late John Dallas. Mr. Harlow was graduated from the University of Maryland as an electrical engineer in 1923 and immediately following graduation was employed by the Philadelphia Electric Co. as a junior engineer. He subsequently was made assistant test engineer at Chester station, and later named test engineer at Richmond Station. He was transferred to the station economy division in 1928 as technical assistant, and in 1936 made assistant superintendent, the position he held at the time of his recent appointment.

J. A. WHITLOW, for the past 20 years Tulsa district manager for the Public Service Co. of Oklahoma, has been appointed head of the company's employee education and information department. C. N. Robinson, vice-president and formerly head of the company's new business department, has been appointed Tulsa district manager and Leslie E. Bates, Jr., becomes assistant Tulsa district manager.

DALLAS J. FRANDSEN, formerly head of industrial power service, was promoted to Mr. Robinson's departmental position. The department will be known as the sales development department and Mr. Frandsen will be in charge of sales in the eastern division.

WRIGHT CANFIELD, engineer, was named director of a newly created research department, with supervision over rates and research. W. D. MCGINLEY, formerly rate engineer and more recently acting manager of the Bartlesville district, was named manager of the Bartlesville district.

CHARLES E. WARSAW has been elected a vice-president and a director and appointed general manager of the Luzerne County Gas and Electric Corporation, including gas operations in the Hazleton area. He is a resident of Kingston.

Mr. Warsaw came to Luzerne County Gas and Electric Corporation as superintendent of the electrical department in 1923, following employment in gas and electric subsidiaries of The American Gas Company, dating back to 1917.

He is a graduate electrical engineer of Iowa State College and has devoted all of his activities to public utility work in gas and electrical operations, also on construction work, particularly in the Luzerne territory, since 1923.

Industry Accountants' Meeting

(*Continued from page* 188)

ings of the Taxation accountants on Wednesday afternoon and Thursday morning, which meetings were, as usual, on the order of a round-table discussion. The number of attendants was probably the greatest to date and the interest shown was clearly indicated by the large number who took active participation in the discussion of the various subjects. Special attention was given to "Assembling Tax Data"; "Pension Funds"; "Section 722"; "Intangible Drilling Costs"; "New Tax Legislation Affecting Public Utility Corporations," and "Amortization of Account 100.5." In addition to these, other subjects were brought up for discussion, among which "Methods of Interim Tax Accruals" elicited possibly the greatest amount of interest and discussion.

A general luncheon meeting on Thursday ended the formal program. Colonel Willard F. Rockwell, Chairman of the Boards of the Pittsburgh Equitable Meter Co., Pittsburgh, Pennsylvania, and the Timken-Detroit Axle Co., Detroit, Michigan, gave a special address on "Free Enterprise."

Following the luncheon, informal meetings of the respective committees were held to discuss and plan for future activities.

The full proceedings of this accounting meeting will be available within a month or so.

CONVENTIONS AND MEETINGS

JUNE

6-7	EDISON ELECTRIC INSTITUTE, Annual Conference, Waldorf-Astoria Hotel, New York, N. Y.
5-7	Public Utility Advertising Association, Chicago, Ill.
19-20	Iowa Utilities Association, Post-War Planning Conference, Des Moines, Iowa.
19-22	The American Society of Mechanical Engineers, Semi-Annual Meeting, Pittsburgh, Pa.
22-23	Canadian Electrical Association, Annual Meeting, Murray Bay, Que., Can.
26-30	American Institute of Electrical Engineers, Summer Technical Meetings, Jefferson Hotel, St. Louis, Mo.

Maintenance and Operation

(*Continued from page* 168)

though they are made out of synthetic material, if you watch your speeds and take fairly good care of them, you will get very fair service out of the synthetic tire in the smaller sizes. However, when you get up to the 750-20's and above, you are not going to get satisfactory service. So far, they haven't learned to make synthetic rubber so that it will stand up on larger trucks. I really should say "plastic" instead of rubber, because the product isn't rubber.

This synthetic material will give fair service up to and including the 920's if you don't overload your truck. It will not stand overloads. The trouble with the synthetic tire is that it will not dissipate heat; and we know that heat is one of the things that cuts down and injures tire life.

There have been quite a few tire fires. In other words, in the larger sizes, in over the road operations, they would generate so much heat that they will actually catch fire when you stop. I know of at least two operators who, when the job is finished and they have reached the terminal, run through a trough of water two or three hundred feet long to cool the tires. If this isn't done, there is quite a possibility that they will break into flames and destroy the truck and cargo.

As to gasoline, you will find that the quality isn't as good as it was, and that you are not getting the mileage obtained with pre-war gasoline. So in figuring your gasoline requirements, it is well to bear that in mind and ask for a little more than you would ask for if you were getting the normal fuel.

Going back to the replacement of vehicles again, there is another thing I would like to suggest. That is—don't be in too much of a hurry when the war ends and the manufacture of cars and trucks has been resumed, to purchase new equipment. Frankly, the manufacturers themselves do not know what they are going to build after the war.

Book Containing Utilities Prize-Winning Advertising Material Available

AN award book, containing reproductions of all Regional and National winners in the 1944 Better Copy Contest of the Public Utilities Advertising Association, has been prepared for general distribution. The Better Copy Contest is the nation's oldest advertising competition in existence today and is open to all electric, gas, combination and transport companies in the United States and Canada.

Entries were made in fourteen advertising classifications, including five classes of newspaper advertising, employee magazines, and newspapers, bill enclosures for residential customers, booklets and pamphlets, window or inside displays, radio advertising, annual reports to stockholders and employees, and outdoor advertising. All entries were judged in regions other than those in which they originated. For example, the entries in the New England region which includes New England and Canada were judged in the Middle West. Regional winners were then appraised by a national committee whose judges, men and women of national reputation, selected the national winners.

The award book has been carefully planned to display all the winners, both regional and national, to best advantage. Copies are available for three dollars and may be obtained from the National Contest Chairman, Chas. J. Allen, director of public relations, The Connecticut Light and Power Company, 250 Freight Street, Waterbury 91, Connecticut.

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Prime Movers, E. R. CROFTS, Rochester Gas & Electric Corp., Rochester, N. Y.

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